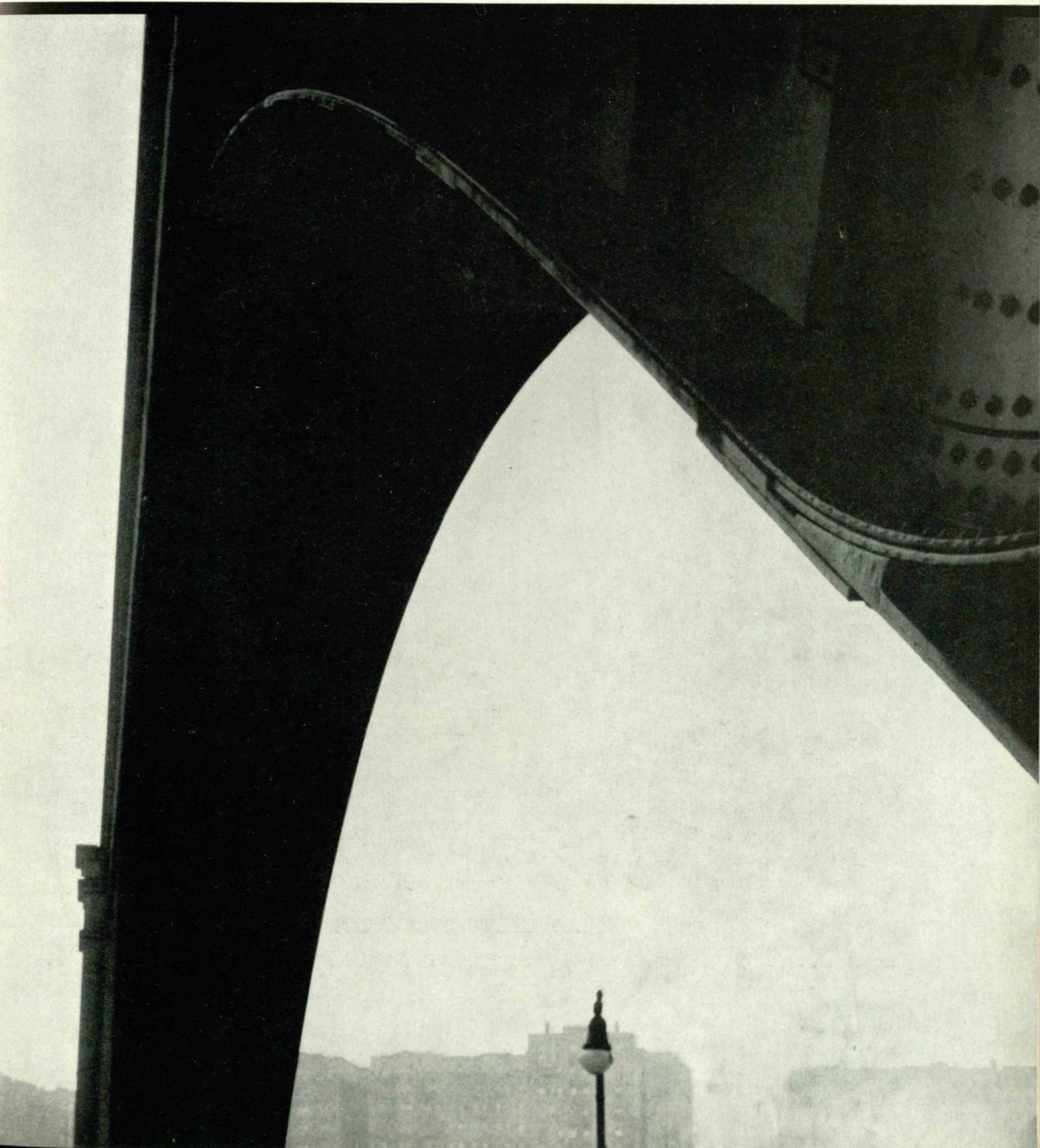


March 1939

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



technology review

Published by MIT

This PDF is for your personal, non-commercial use only.
Distribution and use of this material are governed by copyright law.
For non-personal use, or to order multiple copies please email
permissions@technologyreview.com.

THE

RIGHT COMBINATION

FOR MORE

SMOKING

PLEASURE



Chesterfield

THE BLEND THAT CAN'T BE COPIED

THE RIGHT COMBINATION OF THE WORLD'S BEST CIGARETTE TOBACCOS

Copyright 1939, LIGGETT & MYERS TOBACCO CO.

THE TABULAR VIEW

THE Review is fortunate in numbering among its readers many long-suffering collaborators, from whom it draws from time to time, by questionnaire, symptomatic opinions on subjects of significance. To those whose answers constitute the substance of our discussion of current houses (page 210), then, an accolade. A test of the correlation of these results with those of other investigations of the same topic offers in a poll conducted recently by *Life*, which found that 42 per cent of respondents showed a liking for Modern in architecture. This figure corresponds with 43.3 per cent in The Review's survey. A few months ago, a subscriber survey carried on by the *Architectural Forum*—and consequently somewhat more professional in the make-up of its respondents—found 62 per cent who declared that Modern is "here to stay." ❑ Experimenter and explorer of ocean floors, MAX GENE NOHL, '35, in addition to holding the world's record for depth reached in deep-water diving, is a lecturer much in demand and is, moreover, by way of being a literary artist whose pen is hard put to it to keep pace with the development of his professional career. His article in this issue (page 207) brings the story down to date and is, in its own right, of special note as a study of the operation of the mind in an environment as unusual as spectacular.

ADVANCES toward another and even more difficult kind of extreme are reported by PHILIP M. MORSE, whose account (page 213) of Kamerlingh Onnes' cryogenic researches at the University of Leyden has particular aptness in the light of work which is now going on in this field at the Institute (The Review, December, page 68). Dr. Morse, who is associate professor of physics at Technology and an editorial associate of The Review, is well known to readers as an able expositor of the abstruse and the recondite in modern scientific developments. ❑ The research that discloses and the chemical or physical properties that add worth to some new commercial product are all too often a closed book to the people who will buy and enjoy the product—be it chocolate bar or roofing paper. TENNEY L. DAVIS', ('13) literary analysis (page 205) of a new synthetic opens the book for those to whom nylon is little more than a name. Dr. Davis, Editorial Associate of The Review and Professor of Organic Chemistry at Technology, is a frequent contributor to The Review. So also is NORBERT WIENER, Professor of Mathematics, who reviews William H. George's "The Scientist in Action" (page 202) from the point of view not only of specialized scientist but also of wide-ranging scholar. ❑ To the Cover Club returns this month GEORGE A. MAKAROFF, '26, who supplied the frontispiece of our last issue. His study of a bridge arch connotes many things to those who have regarded it thoughtfully; most of their interpretations may be suggested in the word "peanuts." The Review will welcome statements of the references or allusions which the photograph raises in its readers.

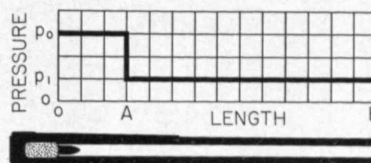
No. 14

Just for Fun!

A CHALLENGE

TO YOUR INGENUITY

WHEN guns are fired, pressures build up suddenly and then fall suddenly to lower values as the projectile moves along the gun barrel. Assuming the idealized pressure graph shown, and neglecting friction, rotational



energy, and gun recoil, how can the pitch of the rifling be specified to give a *uniform* angular acceleration α to the projectile at *all* points along the gun? (Note—A pitch discontinuity at A would make $\alpha = \infty$ there.)

We specialize in solving problems for industry.

Write for information on our
"GUARANTEED RESEARCH SERVICE"

CALIBRON PRODUCTS, INC.

West Orange, New Jersey



PLASTICS MUST BE TOUGH!

Under-curing of plastics is apt to leave soft centers and thus reduce their strength. Over-curing may prove disastrous to color and surface. The sure thing to do is to use the temperature designated by the powder manufacturer and maintain the molds at that temperature with the Cambridge Mold Pyrometer.



Combination and
Single Purpose
Instruments

Cambridge Instrument Co., Inc.
3732 Grand Central Terminal
New York City

CAMBRIDGE
Mold, Surface and Needle
PYROMETERS

Bulletin 194-S gives details of these instruments.
They help save money and make better plastics.

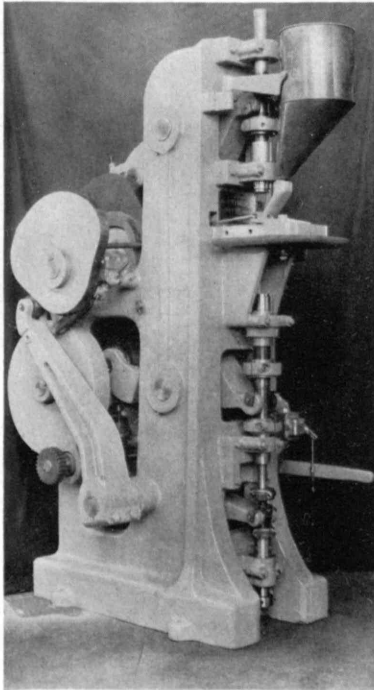
MAIL RETURNS

LETTERS AND PICTURES FROM REVIEW READERS

Implementing Powder Metallurgy

FROM LAWRENCE H. BAILEY, '15:

Referring to Professor Wulff's article, "Powder Compacts," in your December issue, I thought some of your readers might be interested in seeing a picture of one of the "mighty presses" which he mentions and to know that it was invented and patented by a Tech man, the writer.



The first of these presses was designed and built in 1926, so you will see that the art is not very new. There is a lot of secrecy in the oilless-bearing business, and information about it is not readily available. Our contract for the first bushing press restricted us for a period of five years from selling a similar press to another purchaser in the same line of business. No one from our office has been allowed to see any press operated by this first purchaser, who now has about 20 presses.

Many of these presses, omitting a few features restricted by patents, are in use by automotive manufacturers and other producers of bushings. In addition to the original 30-ton pressure model, there is a 60-ton model chiefly used for

knee-action bushings, and there are several smaller models from ten tons on down to machines for making clock bearings.

The art of making articles out of powdered metals is considerably older than this bushing press, as our presses were used in making copper-lead alloy starting motor brushes as early as 1920. This method is also being used for tungsten contact points, G.E.'s Alnico magnets, getter tablets for cleaning up residual gases in radio vacuum tubes, iron cores for radio work, and several other metallic parts.

Philadelphia, Pa.

A Museum Center for Boston?

FROM CHARLES H. BLAKE, '25:

Paul Nelson's intriguing design for a *Palais de la Découverte*, as reported in the January Review (page 116), raises a number of interesting points.

First, the premise that a museum should be flexible and extensible, horizontally and vertically, is fully granted, but I fail to see how the proposed design is horizontally extensible. The arrangement of the Institute's buildings in which successive units are built up around courts adequate for lighting seems more practical. On the other hand, the avoidance of internal props is to be highly commended. Further, placing all exhibits on one level is ideal, even if not to be entirely obtained in practice.

Second, the premise that a museum (of science) should use modern methods and materials of construction is also granted, but why be bizarre?

Third, the premise of seduction and sensational approach for the average visitor is not granted. As a matter of practical experience with museum visitors, I find they have cast-iron psyches. What the

average visitor gets out of a museum is almost in proportion to the degree to which his interest has been aroused (not seduced) before ever he walks through the door. The "sensational approach" helps, but not a great deal.

Fourth, the principle of correlation of the spatial and intellectual arrangement of the disciplines is ideal.

Fifth, without arguing the point, I submit that it is worth while and possible to purvey science to the public through properly organized museums, but such museums cannot remain static if they are to succeed.

Sixth, the modern museum must contain the necessary facilities for educational extension.

Last, Boston seems to have space available to try something which has not been done by any large city in this country, namely, to establish a museum group: fine arts, natural history, science and industry. Adequate space appears to be available adjacent to the present Museum of Fine Arts. In practice, each of the three museums should be an independent entity cooperating with the others. Cooperation between different types of museums is in its infancy, but to some of us, at least, it has already demonstrated its value.

Lincoln, Mass.

Momentum

FROM ERIC THRIFT, '38:

In studying the photograph of Densmore Shute swinging a golf club on page 133 of the January issue of *The Review*, I noticed that the club head before striking the ball seemed to be traveling ahead of the shaft, and I can think of no good reason why this should be so. I wonder if you would give some explanation of this phenomenon.

Winnipeg, Manitoba, Canada

Mr. Thrift's observation that the club head in the Edgerton picture is traveling ahead of the shaft is quite accurate. These pictures regularly show this phenomenon. It is explainable in terms of mechanics. Once a club assembly is under way, the club head, being heavier, tends to gain momentum. After it strikes the ball and has been temporarily set back, the pictures show that it eventually regains its leading position.

A book of Edgerton high-speed pictures is in preparation at present, containing explanations of many similar phenomena.

Skilled Retailing

IN extension of his commentary upon President Comp-ton's article, "New Demands on Technology," in *The Review* for December, we have the following footnote

FROM WILLIAM A. RHODES, '12:

Research into business with the frank object of discovering new or little-appreciated principles is intensely interesting and I think not nearly so foreign to the talents of the technologist as might superficially appear. Here is another: To induce people to work more for a better living, it is necessary to offer them the particular goods and services they desire and at prices they can already almost afford to pay. In other words, skilled retailing is an essential element in production. . . .

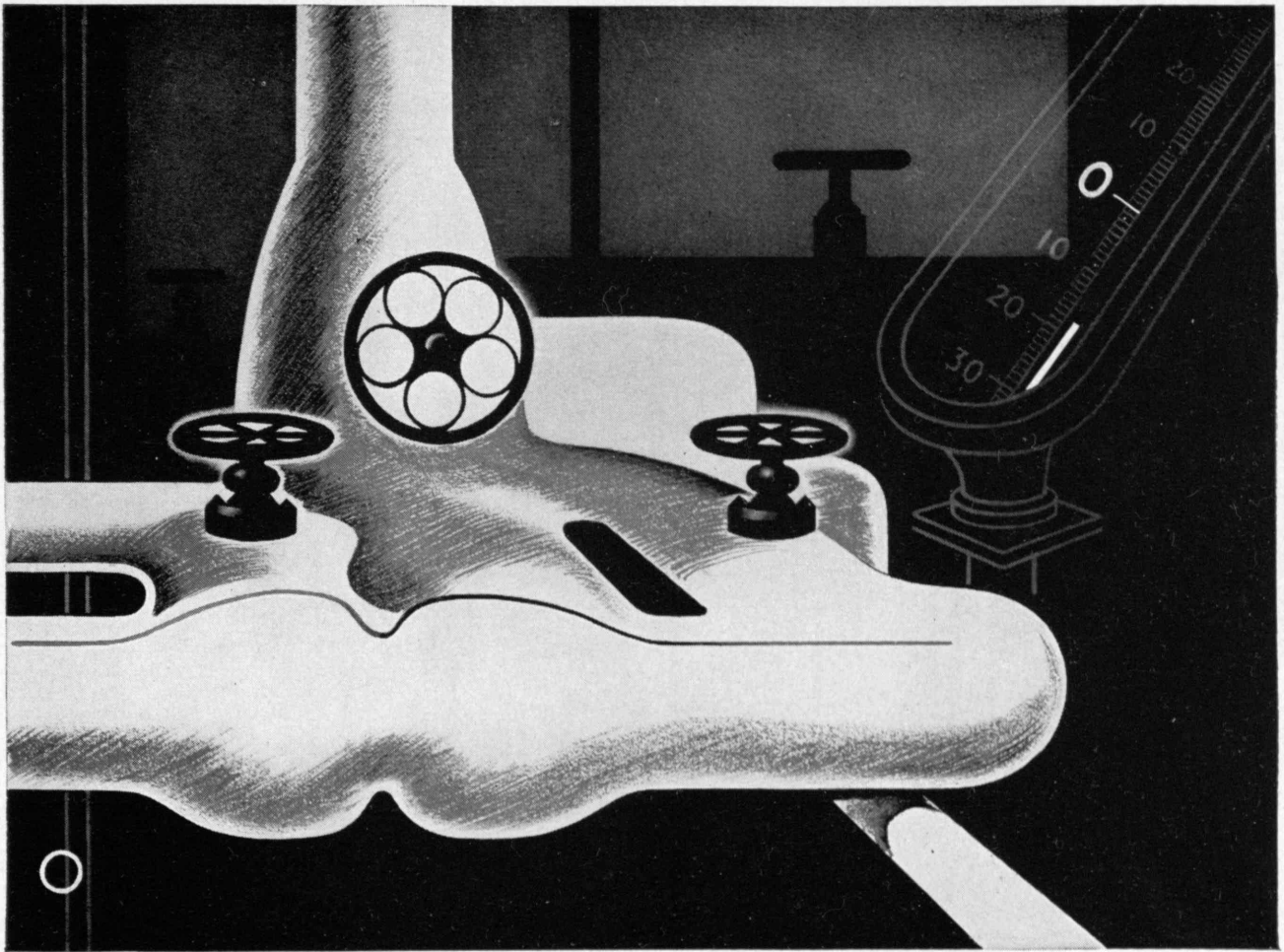
New York, N. Y.

Scientist-Poet

FROM I. I. SCHELL, '32:

Mikhail Vasilievich Lomonosov, referred to in the November issue of *The Review* under "Bronze Murals of Men and Ideas Mighty in Science," was also one of the greatest Russian poets. The mysteries of nature sometimes inspired his works. For example:

"What greater privilege to mortal man could given be
Than the ability the weather changes to foresee."



OUT OF DATE—OUT OF POCKET

...may be literally true unless your material specifications include Molybdenum steels. Present production problems and costs demand these improved materials. Here is one of Moly steel's many successes.

A manufacturer of a large line of valves for operation at sub-zero temperatures required a steel having good impact properties at temperatures down to 150 degrees below zero F. Many different parts were involved.

Chrome-Molybdenum (SAE 4140) steel is standard in this case because of its established ability to

meet strict low temperature impact specifications.

In addition this Chrome-Moly steel is keeping material and production costs within competitive limits. It is yielding the additional profit that always comes from standardization. Substantial fabrication economies are also being obtained.

Our booklet, "Molybdenum in Steel", which contains a great deal of practical data, will be gladly sent free on request to technical students and others interested in improved materials.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

Climax Mo-lyb-den-um Company
500 Fifth Avenue • New York City

Living up to the Greatest Name in Rubber



Giant spikes rip tires wide open on speeding test cars, but LifeGuards retain enough air to carry on to safe straightline stop*

Complete Tire Safety becomes a Reality

MOST dramatic of all rubber's contributions to the public welfare is the Goodyear LifeGuard. It is so named because it guards human life from one of today's deadliest dangers—the peril of a tire failure at speed. How real that peril is the mounting toll of highway accidents gives daily warning. But now the LifeGuard makes the most violent blowout as harmless as a slow leak. It provides infallible protection against *all* sudden tire failures; makes *any* tire completely safe.

LifeGuards take the place of inner tubes; replace them with an invulnerable "reserve tire" that carries you to safety when a casing fails. There's no lurch, no sway, no fight to keep a careening car from the ditch—because the LifeGuard retains enough air to keep your car under perfect control until slowed down to a normal stop. Everywhere acclaimed as one of the major safety advances in motoring history, the LifeGuard adds new lustre to the greatest name in rubber.

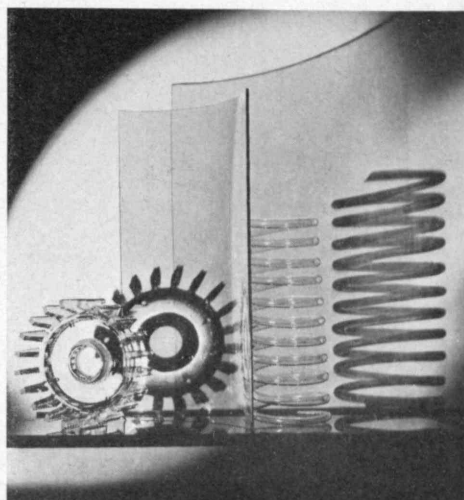


1839 • THE CENTENNIAL OF RUBBER • 1939

Great beyond all other names in rubber is that of Charles Goodyear—discoverer just a century ago of the process of vulcanization that made rubber usable to mankind. To honor him The Goodyear Tire & Rubber Company was named long after his death; from his lifelong effort to extend rubber's utility it takes inspiration.

GOODYEAR

*LIFEGUARD is a registered trade-mark of The Goodyear Tire & Rubber Company.



Rayon reel, panel, and
condenser coil—glass,
as both substance and
shadow illustrate its
grace

Institute of Modern Art, Boston

THE TECHNOLOGY REVIEW

Title Reg. U. S. Pat. Office

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VOL. 41, NO. 5

CONTENTS

MARCH, 1939

THE COVER

HARLEM BRIDGE

From a photograph by George A. Makaroff, '26

GINGERBREAD IN THE SUNLIGHT	FRONTISPIECE	198
"THE SCIENTIST IN ACTION"	BY NORBERT WIENER	202
PRODUCT OF INQUISITIVENESS AND INGENUITY	BY TENNEY L. DAVIS	205
FROM THE DEEPEST DIVE	BY MAX GENE NOHL	207
<i>A Modern Pioneer in a New World Looks Back</i>		
HOW ABOUT THE HOUSE?	BY THE REVIEW EDITORS	210
<i>Shelter as Readers Appraise it from Experience</i>		
PANDORA'S ICEBOX	BY PHILIP M. MORSE	213
<i>Research that Produces Paradox and Surprise</i>		

TABULAR VIEW		193
<i>Contributors and Contributions</i>		

MAIL RETURNS		194
<i>Letters and Pictures from Review Readers</i>		

THE TREND OF AFFAIRS		199
<i>News of Science and Engineering</i>		

THE INSTITUTE GAZETTE		216
<i>Relating to the Massachusetts Institute of Technology</i>		

Editor

FREDERICK G. FASSETT, JR.

Publisher

HAROLD E. LOBDELL

Business Manager

RALPH T. JOPE

Editorial Associates

J. E. BURCHARD · PAUL COHEN · T. L. DAVIS · J. R. KILLIAN, JR. · P. M. MORSE · J. J. ROWLANDS

Staff

Editorial: MARJORIE FULLER, JANE McMASTERS. Business: MADELINE McCORMICK, RUTH KING

PUBLISHED MONTHLY FROM NOVEMBER TO JULY INCLUSIVE ON THE TWENTY-SEVENTH OF THE MONTH PRECEDING THE DATE OF ISSUE AT 50 CENTS A COPY. ANNUAL SUBSCRIPTION \$3.50; CANADIAN AND FOREIGN SUBSCRIPTION \$4.00. PUBLISHED FOR THE ALUMNI ASSOCIATION OF THE M.I.T. H. B. RICHMOND, PRESIDENT; ARTHUR L. TOWNSEND, RAYMOND STEVENS, VICE-PRESIDENTS; CHARLES E. LOCKE, SECRETARY; RALPH T. JOPE, TREASURER. PUBLISHED AT

THE RUMFORD PRESS, 10 FERRY STREET, CONCORD, N. H. EDITORIAL OFFICE, ROOM 3-219, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE A, MASS. ENTERED AS SECOND-CLASS MAIL MATTER AT THE POST OFFICE AT CONCORD, N. H. COPYRIGHT, 1939, BY THE ALUMNI ASSOCIATION OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY. THREE WEEKS MUST BE ALLOWED TO EFFECT CHANGES OF ADDRESS. BOTH OLD AND NEW ADDRESSES SHOULD BE GIVEN



James N. Doolittle

GINGERBREAD IN THE SUNLIGHT

A patterning of dormers bedecked in the best of fret-saw frills

THE TECHNOLOGY REVIEW

Vol. 41, No. 5



March, 1939

The Trend of Affairs

Much in Little

OCCUPYING only about a tenth of the space demanded by its predecessor designed two years ago for the Huntington Memorial Hospital, a new high-potential electrostatic x-ray generator has been built in the Department of Electrical Engineering at Technology. The new device, shown below with Dr. John G. Trump, '33, who has directed its construction, relies for insulation upon compressed air contained in a steel shell which surrounds it. The shell has been dismounted in order to show the high-potential terminal and the equipotential rings below it. The generator was made possible by a grant to the Institute from the Godfrey M. Hyams trust and by Technology's contribution of facilities and of the services of its staff under the direction of Professor Trump. When released, the new generator will be installed in the Massachusetts General Hospital in Boston as a compact source of penetrating x-rays for cancer treatment and research. In the use of gas-pressure insulation the new machine is a refinement of previous electrostatic devices.

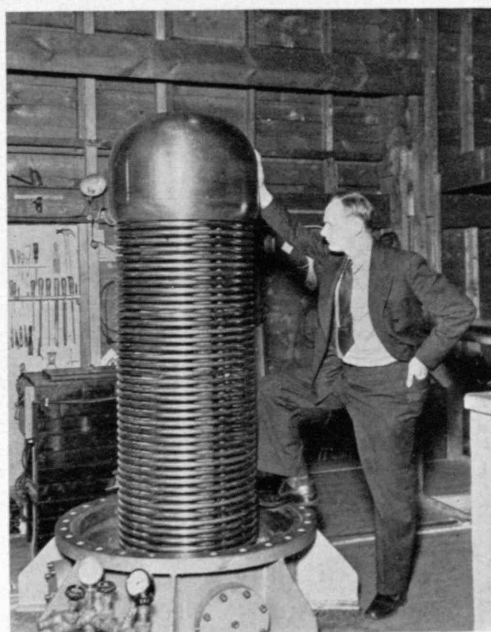
The first electrostatic x-ray generator ever built for therapeutic uses was developed by Technology and installed nearly two years ago in the Huntington Memorial Hospital in Boston. Since then it has been used in giving more than 600 treatment series, totaling about 9,000

individual treatments, for the combating of cancer. Such treatments are far less expensive and much more easily available than radium treatments. The extensive use of the generator under the direction of Dr. Richard Dresser of the Huntington Memorial Hospital aroused much interest within medical circles. That widespread use would be made of the supervoltage x-rays for the treatment of certain types of deep-seated malignancies as soon as compact, reliable, and inexpensive apparatus became available was evident.

The new generator, which operates at 1,250,000 volts, as compared with 1,000,000 volts for the Huntington generator, is much smaller. Within the steel tank inclosing it, air is maintained at a pressure of 10 atmos-

pheres; thus the space requirements for insulation between terminal and ground are greatly reduced. Experiments indicate that another increase in voltage may be obtained through the use of other gases as means of insulation; the full possibilities of various compounds for this purpose are being explored at Technology. The whole apparatus is less than three feet in diameter and less than nine feet in height.

In construction, the generator is a belt conveyor of static electricity, employing the principle embodied in Technology's huge high-voltage generator developed by Dr. Robert J. Van de Graaff and his associates. It employs a hollow brass shell which acts as a high-potential



M.I.T. Photo

terminal, supported and insulated from the grounded base by several insulating columns. The belt, which runs vertically from the base to the terminal, is used to charge the terminal. An economy in the construction of the new generator is the use of one 14-inch belt as contrasted with the six 36-inch belts of the Huntington generator. The belt travels at a rate of nearly a mile a minute, carrying negative electricity up to the high-voltage terminal on one side and carrying positive electricity down from the terminal on the other.

Surrounding the insulating columns and the belt is a series of 40 brass rings spaced about one inch apart, called equipotential rings and employed to insure the grading of electric potential over the whole distance between terminal and ground and thus to lessen the possibility of an arc-over. The x-ray tube, which is located within the equipotential rings between the terminal and ground, is of the customary multiple-acceleration type. Electrons which are accelerated down the tube impinge at very high velocity upon a water-cooled gold target, located within the treatment room on the floor below, causing x-rays to be given off in all directions. These rays are shielded all ways but downward by a lead sheath several inches thick. Another feature contributing to the economy of the construction is the lack of necessity for air conditioning or water cooling of any of the parts of the apparatus except the relatively small target. The greater voltage of the new generator allows it to develop x-radiation of a quality approaching that of the very effective gamma rays of radium.

Although the new generator is expected to be operated usually at its full rating of 1,250,000 volts, it can be operated also over the whole range from the maximum down to 500,000 volts for medical purposes and down to 200,000 volts for engineering experimental purposes. It requires four kilowatts of power, or eight cents' worth, per hour for operation.

During the next six months the new generator will remain in the Institute laboratory in order that it may be used in continuing engineering studies, physical measurements, and biological studies. The physical measurements to be made include the study of the half-layer value — or the thickness of copper which is required to reduce the intensity of the x-rays to one-half their normal intensity — the study of variation of intensity of the rays with changes in voltage, and the measurement of depth dose — or the intensity, at various voltages, of the rays at a depth within the body. For the latter tests, a "phantom" block made of a wood composition which has the same density as the human body is used.

As soon after the end of the six months as the Massachusetts General Hospital is ready for the installation, the generator will be placed in the tumor clinic in the new skyscraper building now being constructed at the hospital, where medical applications of the new machine will have the best of supporting facilities.

One of the Institute's objectives in the construction of the new x-ray generator was the investigation, using a small and flexible machine, of the design factors involved in pressure-insulated, electrostatic generators. Although this new generator, as well as the old one,

develops an intensity of rays greater than that of the entire supply of available radium in the whole world, the use of the much more expensive radium is still required in the treatment of certain deep-seated malignancies because of the penetrating nature of the gamma rays emitted from that element. Sometimes it is possible to use high-voltage x-rays for preliminary treatments and then to complete the treatments with short dosages of radium emanation. One of the goals of the research at Technology is to develop high-voltage apparatus which will produce rays with the penetrating properties of the gamma rays. Development of apparatus of this kind has been undertaken at Technology because of its value as a subject for research and because of its ultimate medical value. The reproduction of this type of apparatus by qualified companies on a basis contributing to the greatest public benefit will be encouraged. Thus both the history of the entire development and the prospective applications of the new generator — not only in medical use but also in physical research — are entirely in line with the Institute's longtime sponsorship of coöperation among all the branches of science and technology.

To Stop Static

THE squawk and the howl of static may cease to plague the radio fan simply because Major Edwin H. Armstrong, professor of electrical engineering at Columbia University, could not keep his back turned on a problem. As long ago as 1914, in collaboration with Michael Pupin, he began to work on the problem of eliminating static from radio broadcasts and, after eight years of study, gave it up, having "completely run out of ideas." But interest in the problem would not down; so in 1924 Major Armstrong tackled it again from a new approach and thus started the long program of investigation which reached successful result in the announcement that the first high-powered staticless radio station will go into operation this spring.

W2XMN, the new station, will employ the system of frequency modulation worked out by Professor Armstrong and first publicly demonstrated in 1935 at a meeting of the Institute of Radio Engineers. The system differs radically from that of amplitude modulation in use in conventional broadcasting. Receiving sets for the new system are going into commercial production by the General Electric Company and when produced on a quantity basis, it is said, will cost no more than the ordinary good sets of today. They are to be able to receive both the old and the new kinds of broadcasting. Since the Armstrong system operates in the ultrashort-wave spectrum and makes available service in this area, it will greatly relieve the danger of monopoly of the air waves. The new station, owned by Professor Armstrong, is in a wooded section atop the Palisades at Alpine, N. J. The 400-foot tower, which has three 150-foot cross arms, rises a thousand feet above sea level. The aerial consists of a series of copperplated steel bars fastened to a boom suspended between the cross arms of the tower. In the new system the wave frequency, rather than the intensity of the radiation, is changed in accordance with the fluctuations of the sound being broadcast.

James Day, '31, IX, is one of the two assistants to whom Major Armstrong declared that great credit is due for the development work necessary to perfect the high quality of the transmission.

Plastics, Planes, and Plans

WHEN George E. Bakeland, Vice-President of the Bakelite Corporation, told the Congressional monopoly-investigating committee that plastic airplanes have been constructed, and stressed their value as a possible solution to America's need for speedy airplane manufacture for national defense, he focused public attention on a development of some years' standing in which Institute researchers were early participants. Plastic planes have been experimented with in all leading industrial countries. A plywood plane was built in England a few years ago, and in 1935 Professors Otto C. Koppen, '24, and Joseph S. Newell, '19, of the Aeronautical Engineering Faculty of the Institute collaborated in the construction of a plane for Harry N. Atwood, '05, of Greenfield, N. H., in which strips of birch veneer were bonded with cellulose acetate for both wings and fuselage. The English plane did not fare so well in its flight tests as did the New Hampshire model, for it cracked in two on landing. The Atwood craft was sufficiently strong but somewhat heavier than necessary. It is believed to have been the first plastic plane to fly in this country, and further refinement would have improved its performance appreciably.

Strictly speaking, the term plastic is a misnomer as applied to these craft which, in the main, are built of plywood bonded with one of the thermoplastic resins. Plywood planes bonded with casein or blood glues were built even before the World War but are difficult of construction because the glues dry so fast that little time is available for setting up. The thermoplastics, which are set by heat, allow ample time for the fabricator to weave up the structure of the part being built and to place it in the mold in which it will be finished under heat and pressure. The ther-

moplastics serve to bond the laminations of wood or fabric into a tough sheet, so that the plane is really one of plastics stiffened and integrated with other materials.

The method of construction described by Mr. Bakeland was devised by Colonel V. E. Clark, '15, and consists essentially of making a wing and fuselage each in two molding operations. The two sections of the wing and the two sections of the fuselage are then cemented and interlocked in a heating process. After they are thus separately completed, they are joined together by a similar process of heating and interlocking. Brittleness and warping, the two chief drawbacks to the use of plastics in the past, are said by Bureau of Standards experts to be overcome by the Clark-Bakelite process.

Added weight — which may be necessitated by the fact that points of concentrated stress may have to be reinforced, since plastics are like wood in having low strength properties in some directions — may be offset by the reduction in costs expected to result from greater speed of production by the new method. The question of the strength of plastics at low temperatures, at which they may become brittle, must also be answered. Permeability of plastics to moisture might well prevent the use of the new technique in the construction of seaplanes, though it would not be a handicap in the construction of planes whose exposure to wet would be short.

Thermoplastics as bonding agents are regarded as desirable because they have one special advantage over glues, in that they have a fungicide effect on the wood which they permeate, rendering it intensely resistant to the attack of fungi or bacteria. When used on the outside surfaces of wings, fuselages, and tails, a well-molded plastic of this sort has a smooth, pianolike finish which is desirable for aerodynamical reasons, and which is very satisfactory to the manufacturer, inasmuch as it saves him the cost and delay which are involved in applying dope to fabric or in using flush rivets on all-metal structures.

Neither intoxicated spiders nor ectoplasmic manifestations, these are photographs of what increasing pressure does to a high voltage jumping from a needle point to a plane electrode in a gas-filled pressure chamber. Each picture shows a number of single sparks spaced at intervals of 15 to 30 seconds. At low pressures, sparks pass across the gap — here of one inch — in a straight line. As the pressure is increased, they no longer travel directly across the gap but take long and crooked paths, and the voltage grows increasingly indefinite.

The uppermost pattern is for pressures up to 50 pounds; in descending order thereafter, the pressures are 75, 100, 120, 140, 150, 160 pounds. The corresponding ranges of voltage within which sparking occurs are — beginning with 75-pound pressure: 127,000 to



135,000; 131,000 to 155,000; 130,000 to 165,000; 123,000 to 175,000; 118,000 to 180,000; 92,000 to 183,000. Critical pressure at which spreading ceases and voltage becomes definite and greatly reduced in value, is reached at 160 pounds, so that an eighth picture would present no spider. This critical pressure is substantially the same for nitrogen and

for air; for helium mixed with three per cent nitrogen, about 500 pounds; and for equal parts of these two gases, 350 pounds.

These pictures were part of a doctorate study of electrical breakdown in compressed gases made under the supervision of Professor John G. Trump, '33, by Alvin H. Howell, '38, now research assistant in the Department of Electrical Engineering. Dr. Howell's work with air, nitrogen, and helium was part of a general study of pressure insulation

"The Scientist in Action"

BY NORBERT WIENER

A SUPERIOR literary training and a superior literary tradition have given to British scientists a much greater degree of articulateness than is possessed by their American colleagues, as well as a much more intense itch to express themselves concerning the cultural implications of their science. This is true equally of their right wing — their Eddingtons and Jeans's who need only the stimulus of a Riemann-Christoffel tensor or the contemplation of the sacred number one hundred and thirty-seven to burst out in paeans of appeasement of the dictator of the universe — and of their left wing — their Hogbens and Haldanes and Levys, those un-knighted, hard-brained sons of toil who attempt to convey to their nonscientific comrades the ethics and the methods and the purpose of the working scientist.

It is to this latter proletariat of science that William H. George belongs. He is a physicist at the University of Sheffield, and his purpose is to indicate how the physicist in particular and the scientist in general carry on their activity of research. Scientific research, according to him, is "a form of human action which gives two kinds of results, the human but impersonal observations called facts, and such arrangements of facts as classifications, laws, and theories." Research is a primarily human activity, characterized by a readiness to deal with new things, an abstention from statements of "should" or "ought," and an avoidance of judgments of value. Facts are observations of coincidences. The selection of facts by an observer is both internally and externally conditioned. The relation properties of observed objects are patterns which Mr. George takes to be nonmetrical and noncausal. The chief function of scientific theory is the arrangement of observations in patterns. Cause and effect are words used to describe the peculiar type of pattern brought out by experiments with the "control" technique familiar to the natural scientist.

The task of science, says Mr. George, is to arrange factual observations in useful patterns, rather than to seek for some absolute truth or inner reality. The truth of a scientific theory depends on its use and usefulness in action, as a guide to future activities. Mr. George urges the claims of his view of the scope and nature of science to assist mankind in the solution of the problems which have come before it and are to come before it, even as to the proper place of science itself as a human activity.

Mr. George's book * is a valuable study in the working technique of science. While it is essentially a philosophical treatise, it suffers from a certain excessive antiphilosophical bias which leads, on the one hand, to an unfortunate isolation from the tradition of Leibnitz, Hume, and the other scholars of former days who were trying to do exactly what Mr. George is trying to do at present and, on the other hand, to an insufficiently sharp and thought-out vocabulary for the description of his ideas. While I greatly sympathize with Mr. George's point of view, I cannot feel that he has fully merited the somewhat immoderate blurb of H. G. Wells's which appears as a band about the dust cover.

* New York: Emerson Books, Inc., 1938. 354 pages, \$3.00.

Fazing Fog

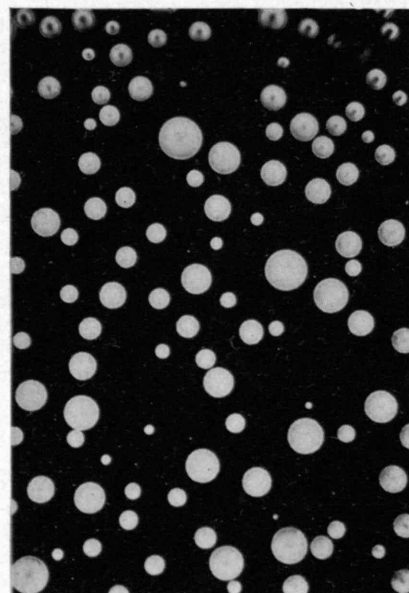
FOG which lies like a dead blanket in still air or is driven with the wind offers a major hazard to the pilot of an airplane coming to land. The landing devices which are being made familiar to readers nowadays do remarkable things, enabling the pilot to locate the field, locate the line and angle of approach — in short, to come practically in contact with the ground with little danger. But in the last few seconds before he sets the plane down, ability to see the land itself is most desirable. Hence, to cut a lane of forward visibility in the fog is an aim which has attracted engineers and meteorologists. Much wild talk has been made about this possibility by the fantastically minded.

Behind many fantastic speculations may often lie a core of solid fact. So with the fog story. The core of fact has been under study and exploration at the Round Hill research division of the Department of Electrical Engineering for some ten years. Investigation of the size and distribution of fog particles, of the liquid water content of fog, of the relation between fog and wind, of different possible methods of fog dissipation, and of experimental apparatus — carried on at the estate of the late Colonel E. H. R. Green — has engrossed during all this time Henry G. Houghton, Jr., '27, and William H. Radford, '32, who are proceeding farther with the work since its transfer to Cambridge. Professor Edward L. Bowles, '22, director of the Round Hill division, is aiding Mr. Radford's investigation of the transmission of light through fog. A tremendous amount of knowledge has been gained which is of vital value in meteorology, and Mr. Houghton's transfer to the Aeronautical Engineering Faculty at Cambridge makes his experience immediately available for meteorological use.

The core of fact removed from the fogs of speculation is this: Fog can successfully be cleared, under usual weather conditions, from a space of sufficient area to be of direct value to aviation. Fog may well be similarly cleared from key points in harbors, such as pierheads, docks, and slips. Fog may well be similarly cleared from

FOG'S FACE AND FOG'S FOES

Photomicrographs of fog droplets taken with special apparatus developed at Round Hill, sandwich the fog dissipator shown with two types of nozzle mounted on the suspended header pipe



the deck of an airplane carrier. For clearing, two ways of evaporating the fog particles in the air have been proved successful: the first, by setting up a curtain of hygroscopic material such as a saturated solution of calcium chloride, sprayed in fine droplets from a series of nozzles ten meters or so above the ground. Fog moving with the wind through the curtain is evaporated, and a clear space of usable size is secured down-wind from the screen of droplets. The second method, employing the same basic idea, keeps the hygroscopic collecting agent — powdered calcium chloride this time — within the apparatus, sucks air into the apparatus, dries the air, and discharges it in such relation to the fog that, through the mixing of the two, the dried air does the work of evaporating the fog.

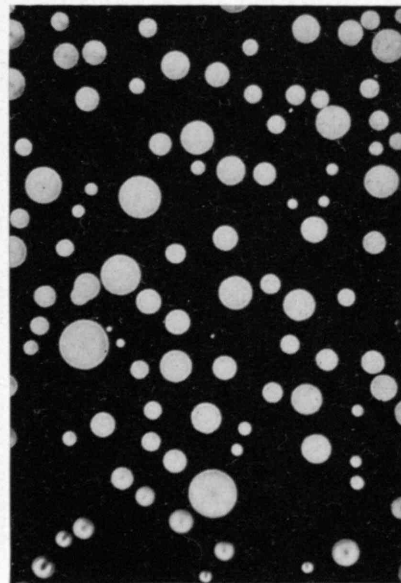
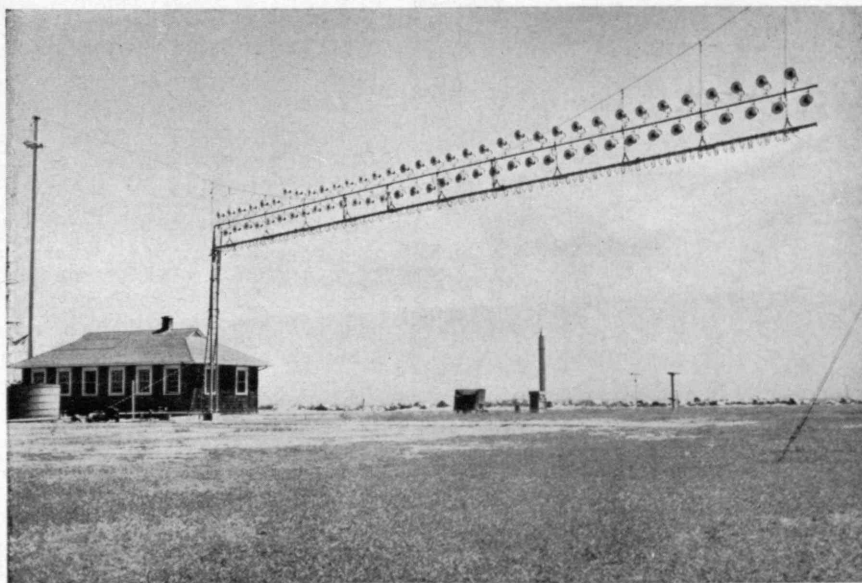
The conditions that must be met by a fog-dissipating system are not few. If the clearing is to be useful, its minimum dimensions are 1,500 to 3,000 feet long, 90 to 150 feet wide, 30 to 60 feet high. Under typical wind conditions, to maintain a clearing of this size it is necessary to sop the fog out of about 60,000 cubic feet of air per second. For the clearing to be valuable to an incoming plane, the system must produce results quickly. Safety and convenience of the landing field demand that the apparatus shall not be complicated and bulky. Economy of construction and use must also be reckoned with.

Calcium chloride, as either spray or powder, works in two ways to bring the desired result. Fog does not evaporate of itself because the fog droplets are immersed in an atmosphere saturated with water vapor. The salt condenses the water vapor surrounding the fog droplets, and the process of condensation liberates heat which further dries the air; the drops, no longer shielded by vapor, evaporate.

The fluid curtain, produced by a series of specially designed nozzles on a header pipe strung at the proper height aboveground and spraying solution pumped to them from a storage tank, was given many tests over a period of two and a half years. Under typical conditions, it produced a clearing some 1,800 feet long, 90 to

150 feet wide, and 45 to 60 feet high. The clearing lay down-wind from the installation, which was placed so as to cut across the prevailing winds at the Round Hill airport. The drops of solution sprayed from the nozzles are just large enough for gravity to cause them to settle rapidly through the passing fog, condensing water vapor as they fall and thus producing a reduction in relative humidity which induces evaporation of the fog droplets. The length of the header pipe and the number of nozzles used are determined by the width of the clearing desired. Since fresh fog may drift in from the edges of the opened space, width of the curtain is important.

Though such a fixed installation is entirely workable in a region of prevailing fog-bearing winds, as at Round Hill, it has disadvantages in other places. Likewise, minute droplets of the sprayed solution may be carried into the clearing and may be a nuisance even though their corrosive properties can easily be inhibited. To secure mobility and to prevent the droplet nuisance, the second apparatus was devised. In this, fine particles of calcium chloride are distributed through a stream of fog-laden air as it is sucked into a cylindrical dissipator. As the particles absorb their quota of water vapor from the air under treatment, they are removed from suspension by an eliminator and may be subsequently reclaimed. The treated air, dehumidified, is blown out at the opposite end of the cylinder in such a direction as will cause it to mix with the fog-laden outer air in the manner best suited to produce the desired clear space. A tunnel big enough to clear the 60,000 cubic feet a second which have been mentioned would be too big to be mobile. Consequently this second device sponges out of a smaller portion of air the total amount of water vapor necessary to clear the total quantity of air. In general, a reduction of relative humidity to 90 per cent — the same reduction as that produced by the curtain of solution — is secured by drying air in the mobile blower to 50 per cent relative humidity and then mixing it with four times its own volume of fog-laden air. The mobile unit, moreover, gets into action in less than a second.



Catalysis in the Refineries

IN the progress of the gasoline industry, few trends stand out more boldly than the steady climb during the past decade toward fuels of higher octane number — that is, fuels equivalent to a greater proportion of isoöctane, the pure petroleum hydrocarbon of superlative antiknock value. Behind this upward thrust lie the powerful incentives of lower specific fuel consumption and greater pay load; behind these economies are the laws of thermodynamics, essentially that the efficiency of an internal-combustion engine increases with the compression ratio. If pistons are to crowd closer and closer to cylinder heads, fuels must be found which will neither preignite nor detonate under the higher pressures and temperatures thus created. Automobile designers have naturally hesitated to produce engines with higher compressions until assured that owners could buy the proper fuels at their filling stations; oil refiners cannot ordinarily afford to introduce a more expensive high-octane gasoline until a substantial fraction of the 30,000,000 cars and trucks jamming this country's roads have engines which will benefit from its use. On the ground, therefore, compression ratios and octane numbers have hobbled upward but slowly.

In the air, however, "the earning power of octane-number improvements" is declared to be "so great that, within practical limits, cost cannot influence the trend to higher octane numbers to any appreciable extent." An increase of even a single point in octane rating is worth up to five cents a gallon to the operator of large transport planes, because the use of 100-octane fuel in place of 87 octane will cut fuel consumption by 12 per cent, or increase power by 25 per cent, in an engine capable of taking full advantage of the first fuel's greater resistance to detonation.

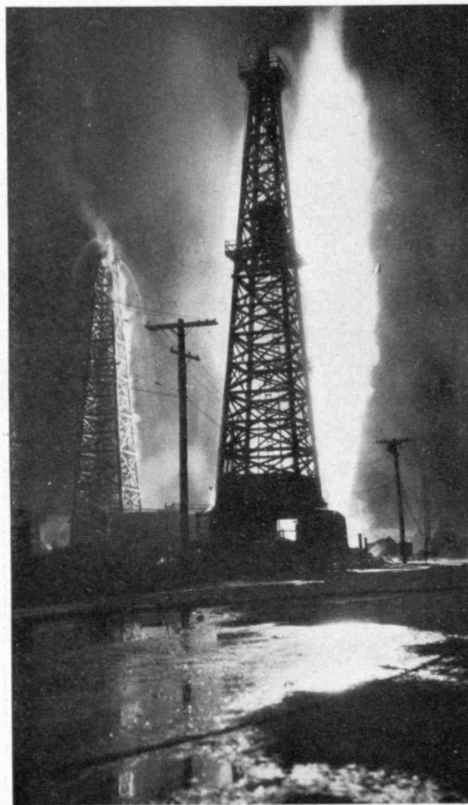
If the China Clipper were to replace its 87-octane fuel and engine by 100-octane fuel and a correspondingly designed engine, the ship could be made to carry ten more passengers each trip. A 20 per cent increase in power, it has been estimated, can cut almost in half the take-off run of a large transport, while a 12 per cent reduction in fuel consumption can lessen the full tank load of such a plane by more than 500 pounds. In a plane used for five years under optimum conditions of load and revenue, such a saving in weight can earn over a million dollars. Even such incentives, however, cannot change an industry overnight, for not only must refining plants be built to produce these fuels but engines capable of burning them with maximum effectiveness must also be designed, built, and installed.

Only the Army and Navy are at present large users of the 100-octane fuels; consumption for the year ending in June will probably be about a million barrels.

To class these supermixtures with ordinary jalopy juice is hardly accurate, for there is little more seven-for-a-dollar gasoline in a 100-octane fluid than there is gin in a Tom Collins.* A typical recipe for such a power cocktail as a bomber might use is 50 per cent of a 74-octane straight-run gasoline, 40 per cent of isoöctane, 10 per cent of isopentane, and three cubic centimeters of tetraethyl lead per gallon. Isoöctane once cost \$20 a gallon and still costs close to 20 cents, but to decrease the amount used by putting in more tetraethyl lead is undesirable, for effectiveness of the lead compound decreases with increasing concentration, and large concentrations create serious corrosion problems.

The urge toward higher octane is, too, regarded in part as reflection of an urge toward conservation, for, burned under the proper conditions, a gallon of high-octane gasoline can do considerably more work than a gallon of ordinary fuel. Improvements in refining find their major significance in the fact that they may put off still farther the conservationists' day of reckoning. With a precision that should put journalism among the exact sciences, the *Oil and Gas Journal* has announced that, on January 1 of this year, the known crude-oil reserves of the country stood in the neighborhood of 14,531,520,297 barrels. While the largest proven underground supply in history, this reserve is only a dozen times larger than last year's petroleum production of 1,214,000,000 barrels. Lest one grow nervous at this apparently slim margin, let him reflect that new fields are being discovered constantly and that improvements in refining methods have already been tremendously effective. In the period around 1909, for example, about 11 per cent of the crude oil taken from the ground was being converted into gasoline; by 1925, cracking methods had increased the yield to 25 per cent; today, the average yield is near 45 per cent; and in immediate prospect are further advances.

Even so, some critics argue, since conservation by any method that requires much equipment and labor is expensive, the most direct method, though it might substitute political drawbacks for economic ones, would be to earmark crudes so that each type should be converted into the products for which it is most suited; in other words, to distribute molecules where each can do its best work. Thus a crude which already had in it many molecules of the type that makes Diesel engines behave well would be used to produce Diesel fuels and not (Continued on page 224)



Ewing Galloway
Oil-well derrick in silhouette against gas flame

Product of Inquisitiveness and Ingenuity

BY TENNEY L. DAVIS

THE new synthetic fiber to which the manufacturers have given the name of nylon probably represents the most important application of chemistry to the useful arts which has been made during 1938. The name of nylon, like the names of kodak and rayon, is a name invented *de novo*, without the use of roots from the ancient languages, to designate something which, like the name itself, is new under the sun. The manufacturers define it as a generic name for all synthetic fiber-forming polymeric amides having a proteinlike structure, and add that the material is characterized by extreme toughness and strength and the peculiar ability to be formed into fibers and into various shapes, such as bristles, sheets, and so on.

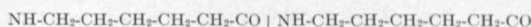
Nylon has the good properties of silk and has additional properties which are better. It may be made into extremely thin fibers of uniform diameter, as thin as a spider's web, which are of greater tensile strength and of much greater elasticity than silk. The fibers, like silk, are soft and lustrous, and they may be dyed with commercial dyestuffs as readily as natural silk and wool. The material is impervious to water. It has the further advantage that it softens or melts at a high temperature—about 280 degrees C.—according to reports. There need, therefore, be no waste, for clippings and scrap may be melted and reworked into fiber. Nylon may be squeezed through spinnerets, as rayon is, to form fibers, or it may be spun like glass from the hot and plastic mass. The fibers or threads which result are glassy, amorphous, and of little strength; but when they are stretched in the cold, they assume new dimensions permanently and acquire new properties. They become silky, lustrous, strong, and elastic. Their molecules orient themselves and produce a true fiber.

The obvious properties of nylon are enough to account for the popular interest in it, but there are many other reasons why it is of interest to the scientist. It is the outcome of research which was at the beginning academic. Dr. Wallace H. Carothers, working in the laboratory of the Du Pont Company, was interested in the properties of substances which contain long chains of atoms. He commenced to think and to experiment in accordance with his own interest and his natural bent and, in 1929, published in the *Journal* of the American Chemical Society a classic paper on condensation polymers. From this time on, the work on nylon appears as a splendid example of group research. Papers by Carothers and his numerous collaborators were published rapidly.

None of these papers, however, contains an account of superpolymeric amides prepared in the way in which our present information leads us to believe that nylon is produced. The news reports tell that nylon is manufactured from no other organic raw material than benzene alone. They give indications of the chemical steps in the process, a process which, we think, can be understood in its outlines by those who are not chemists. If it is made clear, it will offer also another reason for applauding the ingenuity of the Du Pont chemists.

Several of the papers by Carothers and his co-workers deal with the condensation polymer, the polymeric amide, which results from the heating of ϵ -aminocaproic acid. The goatly-named substance is little more than a chain of six carbon atoms linked to each other. The carbon atom at one end of the chain is involved with oxygen to constitute the acidulous carboxyl group. The carbon atom at the other end is attached to an amino group. This group contains nitrogen and is related to ammonia. All of the other

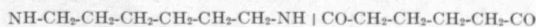
affinities of the carbon atoms are occupied by hydrogen atoms. Now the carboxyl group and the amino group will react with each other when the substances which contain them are heated together; water splits out, and a new linkage is established between the nitrogen atom of the amino group and the carbon atom of the carboxyl. When ϵ -aminocaproic acid is heated, the carboxyl group of one molecule reacts with the amino group of a second, the carboxyl group of the second reacts with the amino group of a third, and so on, forming a long chain of atoms like this:



It will be noticed that this formula repeats itself; it is built up entirely of similar parts, for the product is formed by the condensation-polymerization of a single substance. Imagine three or four hundred of these similar parts strung together, imagine the ends of this long chain attached to each other, and there you have a picture of a single molecule of the polymer.

The first news reports on nylon, last fall, stated that the new fiber was manufactured from two rather costly chemicals, sebacic acid (ten carbon atoms, two carboxyl groups, one on each end) and cadaverine (five carbon atoms, two amino groups, one on each end).

Later news reports described the synthesis from benzene, admirable for its simplicity, directness, and cheapness. Benzene is procured from coal tar. Its molecule contains six carbon atoms in a ring, each carbon atom attached to a single hydrogen atom which, nevertheless, does not satisfy all of its affinity. The benzene is made to combine directly with hydrogen. Each carbon atom is now attached to two hydrogen atoms, as well as to its two neighboring carbon atoms in the ring. The ring is now opened by oxidation: The link between two of the carbon atoms is broken, and the product is adipic acid (six carbon atoms, two carboxyl groups, one at each end). Part of this adipic acid is now treated by a simple and well-understood chemical process whereby the carboxyl groups are, in effect, reduced and aminated. The result is a substance whose molecule contains six carbon atoms and two amino groups, one at each end. The diacid and the diamine are thus produced from the same ultimate raw material by processes which require only the simplest and cheapest of inorganic reagents. When the diamine and the adipic acid are heated together, they yield the plastic:



The product is known as nylon 66 because it is formed from the six-carbon atom diacid and the six-carbon atom diamine repeated alternately.

Six carbon atoms when arranged in a ring constitute a structure which is stable and free from strain. Six is definitely the preferred and natural number of carbon atoms for a stable ring. Further, it has been shown that when six carbon atoms are linked together in an open chain, the system tends to curl up and approach the form of a ring, the ends of the six-membered chain coming fairly near to each other in space. A ring of 12 carbon atoms curls up, as Ruczicka and others have shown, to form a sort of figure 8, each lobe or loop of which contains six carbon atoms. The long chains of the superpolymeric amides are not straight chains but are spirals or corkscrews—and this characteristic of the molecules also helps to account for the strength and elasticity of the fibers which are made from them.



From the Deepest Dive

A Modern Pioneer in a New World Looks Back and Finds Fresh Challenge for the Future

BY MAX GENE NOHL

HAUL away," booms a husky voice. "Haul away, sir," comes the answering call from a remote part of the deck; nimble though half frozen, the sailors leap to their lines.

In a moment I am conscious of motion upward through the water. A slight increase in temperature

feels like a warm glow passing over my entire body. With a decided increase in the intensity of the light, I realize that I am very near the surface.

A moment more, and the upward motion stops. I wait for some announcement from the world above the waters. "You're at ten feet, your last decompression stage," the booming voice tells me over the diving telephone.

I settle down in the rubber diving dress for the last wait before I shall break the surface and return again to the world of air which I left four hours before. Not far away I can see the hull of the mother vessel, like a giant dirigible hovering above me. Over my head a few scattered pieces of ice float in the water. There isn't much to do now except just to enjoy uninterrupted thinking. Not even a fish dares to venture out in these icy waters.

It is December 1, 1937. We have just completed another in a series of test dives from the Coast Guard cutter *Antietam*, lying today in Lake Michigan, about 25 miles northeast of Milwaukee. A few minutes ago I was walking on a soft, muddy bottom, groping in total darkness 420 feet beneath the silver sheet that now is just above my head, a beautiful, reflecting sky stretching over me like a vast expanse of floating mercury — the sky of the strange world undersea.

A multitude of thoughts race through my mind in these minutes of idle relaxation as I wait, at rest and alone, so near to the end of the day's adventure. The dive this day has worked out just as we predicted. To descend to that 420-foot depth, which no man in history had ever before reached, took only a few minutes — nine minutes, to be exact. And the time seems shorter still by contrast with the years of preparation that have gone before. Theories which at one time seemed too remote ever to be brought to realization have now been turned into facts whose reliability has been clearly demonstrated by this day. A rush of reminiscences crowds in on me — reminiscences of those years.

THE RECORD DEPTH — GUINEA
PIGS AND ARTIFICIAL AIR —
WALDEN POND AND THE EN-
GINE LAB — SPANISH PLATE,
RUMRUNNERS, AND RUSTY
MONKEY WRENCHES

Jules Verne's book, "Twenty Thousand Leagues Under the Sea," had been one of my priceless boyhood possessions. Fantastic it was, but it gave me foreglimpses into the totally unexplored world down there — a world which covered over three-quarters of the earth's surface, a world of which we knew practically nothing.

Dreams weren't satisfactory enough, however. In 1928 I got hold of an old World War gas mask and a laboratory cylinder of high-pressure oxygen, connected them, and made my first investigation of the world undersea. This sea was only a swimming pool, and I didn't know that exhaled carbon dioxide, rather than lack of oxygen, was causing breathing difficulties, but with this equipment I could stay underwater a little longer than would have been possible by holding my breath. And I got the momentary sensation of living, breathing, and walking in this strange world of water. It was now in my system, and from this time on, whether as hobby or profession, diving was where my interest would lie.

I entered the Institute because I believed that the best training for the development of the equipment which would be needed in this work was a course in mechanical engineering. In the libraries I found and pored through the ridiculously few books and magazine articles which had been published on diving. However, I found that Boston was the home of one of the largest manufacturers of diving equipment in the world and that up and down the New England coast there were many who made diving their profession. Reading and talking about diving were very instructive, and carried my imagination to new heights. The next step was obvious: I had to possess my own professional diving suit.

It was a secondhand suit but complete with pump, hose, and all of the accessories. The dent in the helmet, I was told, was where a diver had "blown up" and crashed into the bottom of a hull. The suit leaked just a bit, but all in all it was quite a satisfactory piece of gear. It seemed particularly fascinating because of the obvious years of use it had had, apparent from the corroded green color of the helmet and the many patches on the dress. Every week-end after that found me treading the floor of some lake or river, or of the shallow waters off the Massachusetts coast. In a short time I was picking up odd jobs, particularly recovering lost articles. I'll never forget, on my first paid job, that pair of false teeth. The magnification of the water made them look almost as big as I was and scared me half to death.

Two outfits for the undersea hunter appear on the opposite page. In the upper picture, armed with knife and undersea rifle, he breathes man-made air from the diving lung on his back. In the lower, taking aim, and with an undersea camera in the background, he wears a United States Navy deep-water compressed-air diving suit

THE adventures of Captain Nemo and the fantastic voyage of his mythical *Nautilus* had always held an intense fascination for me as a youngster.

Now that I understood the principles and had the knack of handling myself underwater, my attention began to revert to the original idea — that of building a suit which would be comparatively free from the many problems and difficulties that have won for this profession the title of the world's most dangerous business. There were such dangers and problems as the bends, or caisson disease, which turn a man into so much fizzing blood and tissues, like an uncorked bottle of champagne; the squeeze, which could crush a diver's body into just a mass of pulp; the blow-up, which would shoot a man up to the surface like an uncontrolled skyrocket; fouling, which would trap a diver to the bottom; air-hose drag, which, in a strong current, could sweep a man off the sea floor; and other lesser troubles, such as leakage and paralysis.

Somewhat at the expense of my courses at the Institute, I started burying my nose in books on physiology, respiration, and the effects of gases on the human body. Why wouldn't it be possible to breathe artificial air? Man seems to get along very nicely with the oxygen-nitrogen mixture which nature has provided at atmospheric pressure, but it was very apparent to me that that same air was not intended for us to breathe under high pressure. In diving we submit our bodies to artificial conditions. For every two feet that a diver descends, the pressure on his body surface increases over one ton. Why might not some artificial air meet our requirements better?

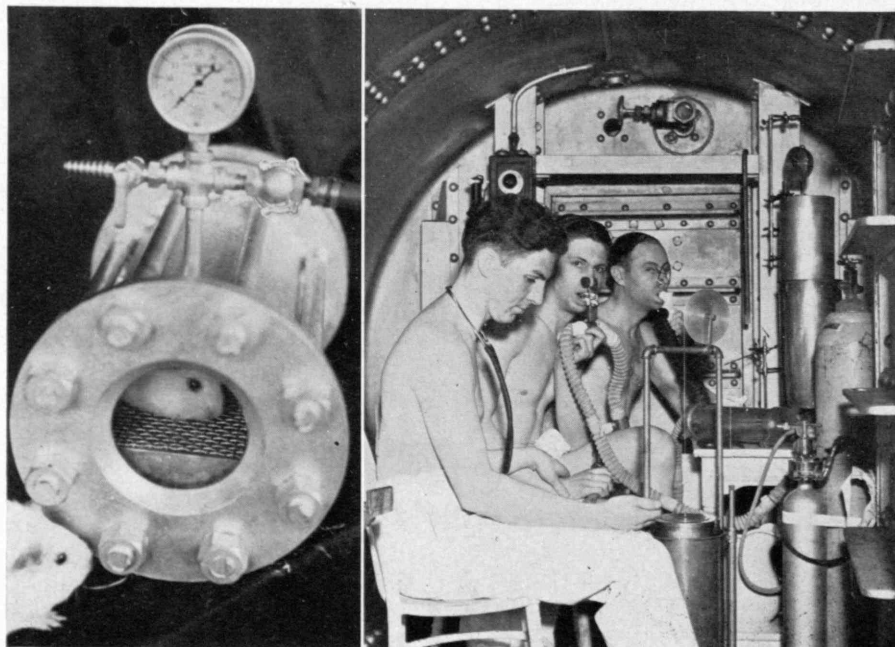
The first problem was to develop a piece of apparatus which could supply such artificial air. Pumping this proposed gas down to a diver through an air hose for rapid ventilation of the helmet and subsequent exhaustion in the water — the system used with the conventional diving suit — was obviously impractical. Rather, the air should be carried on the back of the diver in a compact, high-pressure cylinder.

The additional advantages of this plan were immediately obvious. The diver would be self-contained on the ocean floor. He would control his own air without

depending on a person up on deck, who, not seeing him, had no idea of what he was doing. He would never get into a situation where his body would be crushed into a pulp or squeezed because a surface pump couldn't compete with an increasing water pressure during a rapid descent or an underwater fall. There would be no air hose to foul on wreckage or to tear and release the pressure from the diving suit and give him another, but nonetheless gruesome, type of squeeze. He could penetrate wreckage without fear that a frail rubber hose, carrying his life's subsistence, would snag or tear on a jagged piece of steel plate or sharp coral. Working in currents, he wouldn't be swept off his none-too-heavy feet and lashed around by the terrific drag on his air hose. From a standpoint of convenience and expense, he wouldn't have to carry a 1,200-pound air pump with a crew of four men to turn it, or make an air-compressor installation each time he wanted to take a dive, or clutter up the deck of the mother boat with a huge coil of air hose. The entire apparatus would be on the diver's back, and that is all there would be to it.

My sophomore year found me spending week-ends in Walden Pond, 25 miles from Boston, with a strange-looking diving suit. The helmet and dress were standard Morse equipment, but on the back was a cylinder unit containing our own mixture of man-made air. Winter set in, but my enthusiasm and that of my co-workers was running so high that we hardly noticed the cold. Each week, with picks and axes, we would cut in the ever thickening ice a hole large enough for my extended copper shoulders to slip down into the deep, still waters of the beautiful lake on whose frozen surface Thoreau had lain decades before, peering through the clear ice at the world below. Strange as it may seem, during the bitter cold months of that winter I considered myself the luckiest of the entire group, at least from the temperature standpoint. Well insulated against the cold by suit after suit of the noted red woollens, I was, barring leakage, quite comfortable. Although most people would think of

Guinea pigs and men shared in the development of the artificial air. On the left, a high-pressure animal chamber at the Marquette University School of Medicine. On the right, Mr. Nohl (center) and John D. Craig (at Nohl's left) breathed an artificial mixture of helium and oxygen as air pressure was built up in this chamber. Decompressing in the air lock, they were able to emerge in two minutes, whilst Dr. Edgar End (nearest door), who breathed the air in the chamber, had to remain there 24 times as long to decompress





Evolving perfection of diving dress, continuing symbiosis of diver and helpers. The early suit on the left comprised a helmet made from a five-gallon paint can, dress from discarded inner tubes, shoes from rubber overshoes, sash weights, and garden hose. On the right, just before his record-making 420-foot dive, Mr. Nohl is being made secure in a suit of advanced design embodying the results of experimentation described in his article. But whether his is tyro's or artist's rig, the diver must rely heavily on the patience and loyalty of his crew

ice water as about the coldest thing on the face of the earth, it was fairly sure that the temperature of my environment would not fall below 32 degrees F. The poor fellows on the deck were the real sufferers, standing exposed to the sub-zero gales sweeping across the icy lake.

Occasionally, however, in shallower tests, I would take my diving suit and descend in the well located in the basement of the engine laboratory at the Institute. Here were to be found 25 feet of water, total darkness, and a few rusty monkey wrenches.

Years went on, combining experimental diving in the new suit with almost every conceivable type of undersea work, such as investigating the clues to what happened to a sunken rumrunner and the bodies of her murdered crew, exploring the wreckage of the old Spanish plate fleet off the coast of Haiti, underwater motion pictures in the Bahamas, diving for sponges with the Greek fleet in the Gulf of Mexico, salvaging many sunken ships, locating a gangster's ten-ton "hot" safe, and hundreds of other odd professional diving jobs. The experimental work branched out to the development of undersea cameras, the diving lung, underwater rifles, and countless devices and accessories for work on the floor of the ocean.

During these years the present model of the self-contained diving suit was gradually evolved. The idea of converting a standard diving suit had to be forgotten. It

wasn't satisfactory. We should have to start from scratch and build a radically different type of suit from head to foot.

One day, Hollywood's ace adventure producer, Captain John D. Craig, offered to assist the final experimental work on this proposed self-contained diving suit. At that time Dr. Edgar End, of the research staff of the Marquette University School of Medicine, invited me to work with him and use the facilities of their laboratories. There we built a high-pressure animal chamber in which we could experimentally simulate pressure conditions on the sea floor. Our studies continued on the physiological effects of every known gas. The guinea pigs "dove" in the laboratory with various pressure conditions, decompression schedules, and gas mixtures. Of all these, a mixture of 21 per cent oxygen and 79 per cent helium seemed to be best.

As early as 1873 Elihu Thomson had become interested in the utility of a combination of hydrogen and oxygen for inhalation as a safeguard against some of the perils of high compression, and had commented upon not only their advantages but also the great hazard presented by the explosiveness of the mixture. When in 1919 the availability of helium was a center of much interest, Thomson, reverting to his earlier work, had urged the desirability of experimentation with oxygen in combination with helium. The worth (*Continued on page 232*)

How About the House?

The Business and the Means of Shelter as Readers Appraise Them in the Light of Experience

BY THE REVIEW EDITORS

AN American of average age, of better than average education and income, whether he lives north or south, east or west, is likely to own his home. If he does not, he is prone, nonetheless, to await only stableness of employment before owning. Whether or not he owns, he thinks ownership desirable because it gives him a sense of stability and a sense of pride. He has selected the environment of his house principally for social reasons, and the house itself principally on considerations of site and number of rooms. He reacts against any proposed major changes in the house as he knows it — changes such as elimination of cellar or fireplace. He desperately fears anything suggesting regimentation or standardization; therefore, he rejects for himself a high-grade, well-planned rental community, and even carries this fear to the point of finding common garages undesirable. He is rather confused about Modern architecture but thinks of it in terms primarily of flat roofs and new materials. He is not certain whether he likes it at all, tends not to want it for himself, but has rather meager knowledge of the personalities of the leading Modern architects. He is quiet in his praise of Modern if he likes it, but vehement in his denunciation if he does not.

This man has learned by experience that the house should not be regarded as an investment, but he does not think his own house cost him too much as compared with other things. Despite this view he does think the building industry as a whole is out of date. He feels quite strongly that lighting of houses is archaic, and he

WHY HE WHO OWNS WOULD OWN AGAIN — LAST STRONGHOLD OF INDIVIDUALISM IS THE HOUSE — IN DEFENSE OF INEFFICIENCY — MODERNISM AND METRO-GOLDWYN-MAYER — DOWN WITH THE NOISE OF THE NOISELESS

is not too optimistic about contemporary house-heating methods; but he thinks that plumbing and sanitary measures are, except for leaky valves, all right. Although the house he owns has caused him some headaches, he would, if given a chance to start over, own another house. And he would positively employ an architect to create it. If he cherishes any pet peeve about his house, it concerns itself with high

taxes, but these are, after all, not nearly so much a function of the dwelling as of other aspects of the community in which he lives.

This composite picture has been drawn by The Review Editors from the answers to a questionnaire sent recently to a selected group of readers — principally Alumni of Technology, all of the middle income group, distributed geographically in proportion to the distribution of the entire alumni body. Though the questionnaire was admittedly long and difficult, the patience and coöperation of this group were so great that an unusually high percentage of carefully filled out documents was returned.

In conducting this small survey, The Review has had no intention of trying to adduce general conclusions from meager statistical evidence. It has merely conducted an essay in sampling — sampling of a group of fairly similar education, of roughly uniform income, a group of men and women who, though they profess surprise at being told so, are rather definitely among the economically privileged class. The list was, so far as possible, kept free from professional housers.



W. W. Lewis, '89

SURELY NOT THIS . . .

An Indian hut at Red Lake Reservation in Minnesota



W. W. Lewis, '89

NOR YET THIS . . .

A native dwelling in Panama



© F. S. Lincoln, '22

BUT SHALL IT BE THIS . . .

Traditional as expressed in a siesta porch in Baton Rouge, La.

Though for convenience in subsequent discussion, percentages and ratios will be freely used, the reader should be warned against imputing any extensibility to these figures; all they connote is that of the 120 or so who answered the questionnaire, such a proportion held such a view. On any statistical basis the result can be regarded only as an incomplete footnote to the unexplored text of housing-market analysis. It is fair to remark, however, that trends appearing in the early tabulations were maintained as further results were recorded.

ECONOMICS OF THE HOUSE

President Hoover's Conference on Home Building and Home Ownership some years ago came out squarely for the thesis that everything should be done to encourage home ownership by every American citizen. But long years of depression have made most students of housing skeptical of this thesis. What, then, did Technology Alumni think about the desirability of home ownership? The result was uncolored by the status of those who answered. Only about 25 per cent thought it desirable for every family, but almost everybody thought it desirable for those whose employment was regionally stable. This criterion dominated the ballot to the extent of close to 50 per cent. About 25 per cent suggested that ownership is desirable only for those in the medium to upper income brackets, while the rest suggested such conditions as stable economic status, the existence of low mortgage rates, stability of housing requirements, that the husband and wife be over 30 years of age or have children, that the family be temperamentally suited for the task. Only two voters felt that home ownership might be desirable for no man.

About two-thirds of those answering the questionnaire do own their homes, and they were asked to assign the reasons why they had chosen to do so. Many voted for more than one reason, so that 235 votes were recorded. These may perhaps most conveniently be tabulated:

Sense of stability	63
Pride of ownership	54
Desire to have own way with remodeling	39
Economy as compared with renting	29
Just a love for land you own	26
Protection for family on death	24



Samuel H. Gottscho

OR THIS?

Modern as current materials embody and techniques present it

Scattering votes were recorded for a better environment for children, for the advantage of compulsory saving, for the better social position enjoyed by a home owner, for the better citizenship created. One man reminded us that from our list we had omitted the principal factor — that it is impossible to rent a home with exactly the accommodations desired. Almost as difficult, of course, is to buy them out-of-hand in the open market. Curiously enough for these days, only one voter mentioned that the home might be a hedge against inflation. For every man who voted for economy in ownership, there was one to say "ouch," "minus factor," or "no, my God, no." Apparently the cliché about the "bundle of rent receipts" does not enjoy its erstwhile popularity.

However, though many home owners recognized that home ownership was an expensive business, not to be justified on purely economic grounds, they made haste to add: "I can afford the emotional pleasure derived and have the means to indulge myself in providing the extras not available in rented quarters." "A stable landing field is desirable." "I can afford to be satisfied with the dividends of contentment."

This general philosophy of the fundamental desirability of ownership ran as well through the minds of those who for one reason or another occupy rented dwellings. Out of 79 votes, the possibility of ready change of location accounted for 30, while flexibility in family needs and economy accounted for 17 each. But two-thirds of the renters had rather own.

Now the reasons for ownership assigned by the owners were those which had motivated them in becoming owners. Had time soured them in any particular? Had expectations proved unfounded? Only one-fifth had anything to complain of on this score, and most of these either had found that the house cost more than expected or had suffered the impact of increasing taxes. But even the view of these people was well summarized by the man who said: "We owned and lived in the house 24 years and think it was worth it even though the capital is now essentially lost." Moreover, some reported that all the expected values had increased, while almost two-fifths had found additional, unexpected values. These latter values, it must hurriedly be said, were largely concerned either with gardening or with the uncertainty of other investments under the New Deal.

At this point it was reasonable to ask: "If you could start from scratch again, would you own?" Sixty-nine out of seventy-eight owners would, and most of them went beyond mere assent, to add emphasis through some phrase, such as: "Sooner than I did."

With this heavy bias in favor of the intangibles of home ownership, one would not expect the voters to evince much interest in the planned rental community. For this purpose we set up a hypothetical high-grade community. Would they rent houses in such a community if the house facilities were exactly as desired and if they could dispose of their present houses without loss? Less than one-seventh would consider it, and two-thirds positively would not.

The question brought out some sulphurous comment about planned economy as bodied forth in such a development. Here are typical remarks: "Don't like to be coördinated." "A community like Radburn tends to bring all to a common uninteresting level of complacent mediocrity." "Would not want to head a line of nomads." "I don't like planned communities as they lack individual opportunities for the home lover. They are too regimented. The people are too much like my own social set. It makes life dull."

One of the common arguments against home ownership is that it is not flexible in providing for expanding and diminishing family demands. Two questions sought to evaluate this argument, which seems to have had reasonable confirmation from our respondents. About half our owners had bought houses originally just equal to their then needs, and half of these now found their houses inadequate. The other half of the owners had bought in anticipation of future needs. One quarter of these still found the house inadequate, and another quarter found it excessive. Hence about one half of all the owners had not found the flexibility which is desirable.

As a side light on the way in which people finance their houses, it must be added that only one quarter of the home owners set aside regular reserves for depreciation, obsolescence, and maintenance. This does not mean, of course, that the other three quarters would be unable to pay maintenance charges when incurred, but means merely that psychologically a jolt will be due for the householder every time the painter, the plumber, or the roofer brings in his bill.

THE HOUSE ITSELF

It was then of interest to determine which factors had prompted a choice of community and which had led to selection of the precise building occupied. Our contributors were asked to assign numerical valuations to a number of categories under each of the headings in the following tabulation. By assigning a maximum number of points to first place and one less point for each successive lower place, as in the scoring of duplicate bridge, it was possible to build up a point score for each category. This point score, divided by the number of times the category was cited (some did not fill in all categories), provided an average point score for each category. These, together with the number of times each was mentioned and the number of times each was awarded first place, appear thus in tabulation:

Environment of the House

(Maximum average number of points possible: 9.0)

	Total Points	No. of Times Mentioned	Average Points	No. of Times First Place
Social environment	614	85	7.2	29
Healthful environment . .	602	82	7.3	21
Transportation facilities .	591	87	6.8	15
Schools	529	74	7.1	15
Beautiful countryside . .	385	73	5.3	16
Other town services	288	51	5.6	1
Recreational environment	287	53	5.4	5
Safety	217	56	3.9	6
Accessibility for servants.	117	34	3.4	0

It will be seen that on any basis social environment was the dominating factor in the choice of a community, though run almost to a dead heat by the healthful nature of the environment. Schools also placed high and were slightly more important to those who mentioned them than was transportation. Though a pleasant countryside was of first importance to a number, it was not of vital significance to nearly so many. Curiously enough, town services did not receive a high rating, though some reporters may have felt that they were insured by a good social environment, something which, it may be said, does not necessarily follow. The servant problem failed to bulk as large as expected.

A similar technique of evaluation was applied to the factors influencing the choice of the specific building, with the following results:

The House

(Maximum average number of points possible: 14.0)

	Total Points	No. of Times Mentioned	Average Points	No. of Times First Place
Number of rooms	990	83	11.9	25
Site	953	82	11.6	28
Orientation for sun and breeze	700	72	9.7	7
Privacy	698	71	9.8	7
Exterior appearance	684	73	9.4	7
Plan for good ventilation and sunlight	667	71	9.4	1
Arrangement of bed- rooms and baths	585	69	8.5	1
Arrangement of down- stairs social quarters . .	561	67	8.4	3
Heating equipment	561	68	8.3	0
Kitchen plan	435	62	7.0	0
Bathroom equipment	422	58	7.3	1
Garage convenience	331	61	5.4	0
Kitchen equipment	323	56	5.8	0
Garage capacity	181	48	3.8	0

It was encouraging to those who work with such things to see the high marks accorded to orientation and privacy; it was equally surprising to find that the equipment of the house did not occupy a more dominant position among engineers in what is regarded as a soulless world; it was distinctly a hopeful sign to find that the garage was not so emphasized as one might expect.

The voters were also asked to indicate which of the factors in selection of the house were absolute and not subject to compromise. The results closely followed those of the foregoing table, starting with 45 on the number of rooms, 42 on site and privacy, 35 on ventilation and heating, and but five on the garage capacity.

Had these occupiers of homes been successful in obtaining what they wanted? Remarkably so, if the replies are to be believed. Eighty (*Continued on page 226*)

Pandora's Icebox

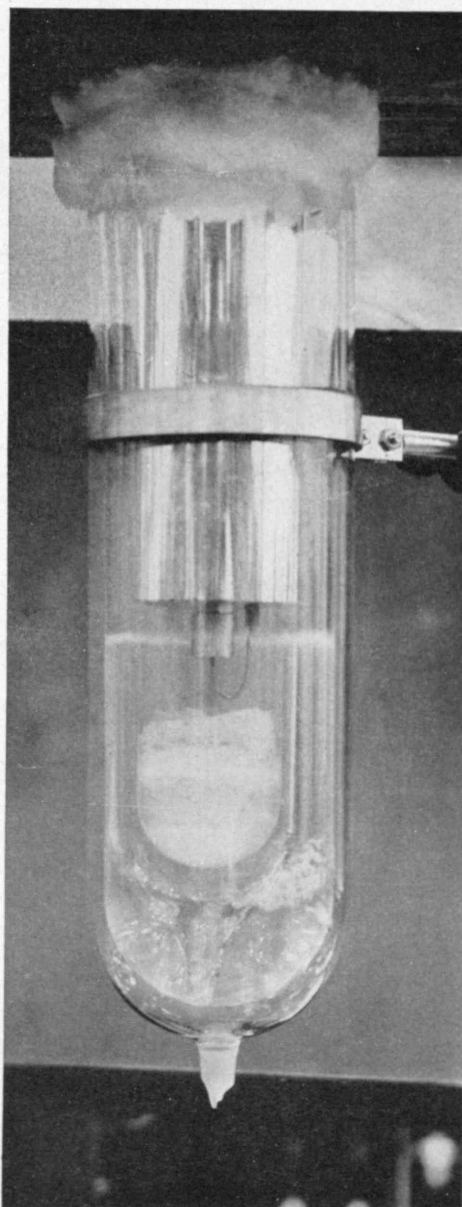
*How the Quest for Absolute Zero Illustrates Again
That Research May Produce Paradox and Sur-
prise as well as Foreseen Result*

BY PHILIP M. MORSE

THE story of research on materials at very low temperatures affords a good example of the surprising grab bag which painstaking scientific research can turn out to be. You reach in for a lollipop and come out with a platinum wrist watch or some other delightful gewgaw. Kamerlingh Onnes and his helpers at the university at Leyden, Holland, thus set out to study the compressibility of gases at very low temperatures; they ended by discovering some completely unexpected and amazing properties of solids and liquids.

In 1900, when Onnes was starting his laboratory, the study of the behavior of substances at low temperatures was considered to be an interesting, but not very exciting, field for research. It was expected that as a gas was cooled far below zero it would become less and less capable of keeping its molecules apart under applied pressure, until eventually it would collapse into a liquid, which in turn would later solidify. If the solid were then further cooled, the random jiggings of its atoms would weaken until finally, at the ultimate limit, minus 460 degrees F., all motion would cease. It was expected that at this limit, called absolute zero, everything would be solid, for here everything had to be quiet, in a rigid conformity and regularity — the dictator's ideal state. Most scientists agreed in 1900 that to follow these changes down as close to absolute zero as possible would be a worth-while task — for someone else. As for themselves, there were many other more exciting and easier fields of study.

After all, research at low temperatures was, and still is, an expensive and laborious task.



E. A. Averill

Pictured here, for the first time, is solid hydrogen as it was produced in a demonstration by Professor Frederick G. Keyes at the Institute. The white mass in the innermost flask is the hydrogen; the bubbles of the boiling nitrogen in a surrounding flask may also be seen. When this demonstration was carried out the coldest spot in all the world was probably that pictured above

There are the terrific difficulties of experimenting with the chilled substances, watching them, and, at the same time, insulating them from the warm outside so as to keep them chilled. To materials near absolute zero anything else is superheated: An ordinary lump of ice has the same effect on liquid air as a red-hot pebble has on water.

Then, also, the process of removing the heat from a substance must be indirect. The usual way is to use a cooled gas to cool the substance. To cool the gas, one first heats it by compressing it, then removes its extra heat and lets it cool itself by expanding — either shooting it into an evacuated chamber through a nozzle or letting it do work as it expands. This first batch of cooled gas can then be used to cool still further the next batch of compressed gas and so on, until enough heat has been extracted to liquefy the gas and the limit is reached for that gas.

The nozzle method is the one used in most commercial liquid-air machines. It has the advantage of not requiring moving parts running at low temperatures, so that the consequent difficulties of lubrication are avoided. But it has the disadvantage that it will not "take hold" at ordinary temperatures with some gases. Unless hydrogen is already cooled to liquid-air temperatures, expansion through a nozzle heats, instead of cools, it. Likewise no cooling results in helium until it has been precooled with liquid hydrogen. In order to reach the temperature of boiling helium — about 7.2 degrees above absolute zero (or minus 452.8 F.) — Onnes used liquid air to obtain liquid hydrogen, and this in turn was

used to obtain the liquid helium. Since liquid hydrogen is dangerously explosive unless absolutely pure, the process is perilous as well as complicated.

The alternative method, that of making the gas do work when expanding, will work on any gas at any temperature; but it requires moving parts at low temperatures, and the lubrication difficulties have only recently been overcome. The low-temperature apparatus being developed by Professor Frederick G. Keyes at Technology uses this method and thereby avoids the need for liquid hydrogen as an intermediate stage in getting liquid helium.

The next problem Onnes faced was to obtain temperatures below 7.2 degrees absolute and eventually to obtain solid helium. Somewhat lower temperatures were reached by pumping off the helium vapor above the liquid, thereby cooling the liquid by evaporation. And now came the first unexpected result: Although the liquid helium cooled, no solid helium appeared. Prolonged investigation showed that solid helium can be made by combined compression and cooling, but it cannot be made by evaporating the liquid; though every other gas can be solidified by the evaporation method. Still further study showed that with evaporation and cooling, the liquid helium does change, not into a solid but into another form of liquid helium. And this new liquid, called helium II, is the most remarkable of all liquids.

Ordinary liquid helium, helium I, is not particularly unusual. It is colorless; its density is about one-seventh that of water; its viscosity (resistance to stirring or to leaking through holes) is somewhat lower and its heat conductivity somewhat higher than that of water, but this condition is to be expected at low temperatures. It bubbles away as the helium vapor is pumped off, quite like boiling water. When the temperature goes below four degrees absolute, however, the bubbling stops abruptly; the liquid has changed to helium II. There is not much apparent change beyond the cessation of bubbles: The liquid is still colorless and there is no sudden change in volume. But "beneath the surface" the change is as profound as with some of the split personalities reported by psychiatrists: The countenance is the same but the actions show a new personality.

Liquid helium II is an almost perfect fluid. Its viscosity is less than a three-hundredth that of water, less than a hundred-thousandth that of crankcase oil. It will actually flow through minute holes and cracks six times more easily than will ordinary air. A piece of apparatus may be watertight and even airtight and yet not be helium II-tight—a fact which creates difficulties.

In addition, helium II is an almost perfect heat conductor, being about a hundred thousand times as good as water is and

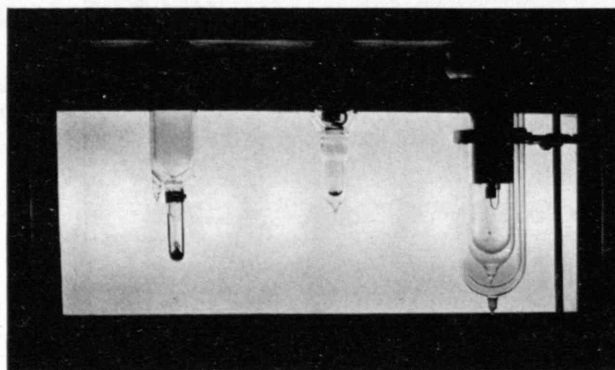
even two hundred times better than ordinary copper. No irregularities of temperature are possible in a liquid of such great heat conductivity, which fact partially explains the lack of bubbling. Also it seems to be the only liquid which can be cooled to absolute zero without freezing. Somehow helium II is as good as a solid in its regularity and yet is better than any other liquid in its fluidity. Its remarkable properties will probably make it a dangerous siren for the theoretical physicist, luring him to attempt a theory to explain its peculiar behavior and then shipwrecking the theory on its irreconcilable properties. Yet it must be explained before we can completely understand ordinary liquids, just as paranoia must be explained before we can completely understand the normal human mind.

While the research on liquid helium was going on, other workers at Leyden were studying the properties of metals at these extremes of cold. The expectation was that many of a metal's properties would change slowly and regularly as absolute zero was approached: Its electrical resistance would diminish, as would its resistance to heat flow and its heat capacity, but none of these would become zero until the ultimate, unattainable zero of temperature were reached. No peculiar magnetic effects were expected, except perhaps with iron.

Again Dame Nature disappointed the experimenters' expectations and delighted their souls with new wonders. When measurements were made on lead, electrical resistance vanished suddenly at 13 degrees absolute. Below this temperature the measurements seemed to indicate that the lead had no electrical resistance at all, though its resistance to heat was normal. This change seemed incredible; so a more searching experiment was tried. A ring of lead was put in the apparatus, and a magnetic field was applied. The lead was then cooled to the temperature of boiling helium, 7.2 degrees absolute, and the magnetic field was turned off. At ordinary temperatures a momentary surge of current is produced when the magnetic field is cut off; the current starts to move but is almost immediately stopped by the resistance of the lead. The electrons, which are given a kick by the cessation of the field, bump into lead atoms, get discouraged, and soon stop. It was felt that if any minute amount of resistance were left in the lead at 7.2 degrees absolute, so that the electrons would have to

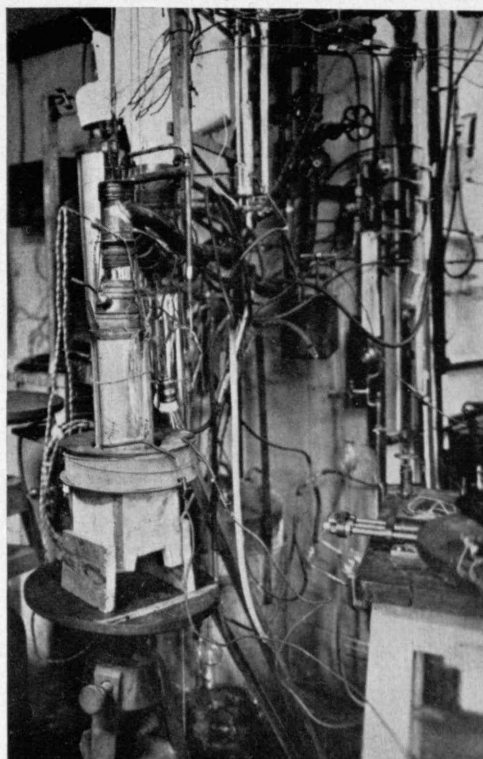
bump into even only a few of the billions of atoms they passed as they went through the metal, the current induced in the lead would soon die out.

Imagine the Leyden workers' surprise and delight when they found that the current in the loop, once started by cutting off the field, kept on indefinitely. The current gives the loop magnetic properties, just as does current sent through an ordinary loop of wire, and

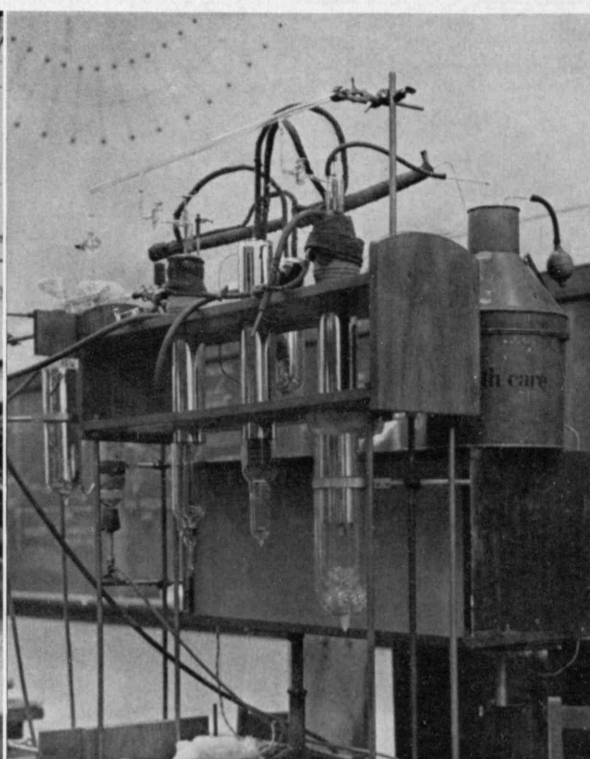


In silhouette, the graceful outlines, at the right, of Dewar flasks mounted in apparatus for the producing of extremely low temperatures

E. A. Averill



Wide World



E. A. Averill

Evolving simplicity in cryogenic apparatus. That on the left was used by Keesom at Leyden University in 1932 to produce a low of minus 489 degrees F. The shrewdly simple demonstration apparatus designed by Professor Keyes for producing low temperatures with the flasks of the silhouette opposite is seen at the right

the current could be detected by these properties. But the current in an ordinary loop must be kept going against resistance by the use of a battery or generator, whereas the current in the cold lead loop keeps going of its own inertia, the electrons sliding around continually in their perfectly smooth toboggan slides. Loops of lead have been kept for weeks at 7.2 degrees absolute and no diminution in the induced current has been found. Somehow all the countless billions of lead atoms have parked themselves off the current boulevards, so that none is hit by the electrons. No traffic lights and no collisions — a model of the motorist's heaven!

This phenomenon of superconductivity, as it is called, occurs in some metals but not in all. Mercury is superconductive below 4.2 degrees absolute, but copper has not yet been made superconductive. The transition point, the point below which aluminum is superconductive, is 1.1 degrees absolute; but silver's transition point, if it has any, is below 0.2 degrees. It is possible that all metals would become superconductors at a low enough temperature: All we know at present is that only 15 metals have been made superconductive, and that the transition points of the other metals have not yet been reached. There are many alloys which become superconductors; among them is an alloy of gold and bismuth, though neither of the constituent pure metals has been made superconductive. Niobium carbide, which is not really a metal, has a transition point at the "high" temperature of 18 degrees absolute (minus 442 degrees F.).

Naturally the explanation of these amazing properties has become a sort of mental Matterhorn for theoretical physicists: Many have tried it but none so far has conquered the summit. How can the electrons find absolutely smooth paths past all imperfections of the metal,

through or around every obstructing atom of the substance, so that they can keep on sliding indefinitely? Why do metals suddenly become superconductive at the transition point and yet show no other concomitant abrupt change in properties? None of these questions has been satisfactorily answered.

It seems certain that there is some connection between superconductivity and magnetism. A metal's transition point is lowered somewhat by the presence of a magnetic field. Moreover, below the transition point the metal refuses to contain any magnetic field at all. The field is pushed out into the surrounding space, and, if the metal is hollow, the field within the hollow is trapped. If the outside field is shut off, the field in the hollow space stays caught, for it cannot get out through the surrounding metal. For a short time it was thought that all the phenomena of superconductivity could be explained as magnetic effects, without needing the incredible free flow of current. This belief was soon shown to be wrong, however: The effects produced in the lead ring are true currents, and they really do flow without friction.

The magnetic field is also used to obtain the lowest temperatures so far reached. Temperatures lower than the boiling point of helium can be reached by evaporating the liquid at reduced pressures, but this method has its limitations, for our pumps are not perfect, and the helium cools less easily by evaporation the colder it gets. We cannot use another gas to go farther, for all other gases are solids at these temperatures. Obviously a new technique had to be developed. The new technique, as worked out, utilizes the magnetic properties of certain salts of the rare-earth elements. These salts heat when magnetized and cool when demagnetized — that is, when the outside magnetic field (Continued on page 233)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

At the Fairs

TECHNOLOGY Alumni among the millions expected to throng the New York World's Fair after the first of May will have a double opportunity to record the fact of their presence through the collaboration of the Technology Club of New York and the Alumni Association itself. At the Fair grounds registration will be provided for by the Association in the Institute's exhibit which will be housed in the National Cash Register Building.

All Technology men visiting New York are invited to visit the new quarters of the New York Club, located at 24 East 39th Street. Registration facilities will be available there and will be checked daily with information from the registry at the Fair itself, so that visitors are assured of a daily index of which of their classmates are in town and where they are staying. The hospitality of the New York Club, moreover, extends beyond this. Guest cards will be issued to Technology men visiting the city and will provide for use of all the Club's facilities, including not only the restaurant and bar but also reading rooms and sleeping accommodations as well.

Technology people attending the Golden Gate International Exposition on Treasure Island in San Francisco Bay are afforded opportunity to register through the cooperation of Pan American Airways and the M.I.T. Club of Northern California. The official registration bureau is at the air line's traffic counter which is to be found in the Administration Building on Treasure Island.

Sloan Fellowships

THE fellowships established at the Institute last year for postindustrial social and economic training for young industrial executives will be increased to ten this year under a new grant of \$32,500 from the Alfred P. Sloan Foundation of New York. This is more than double last year's fellowship fund under which five young executives are now studying in the Institute's Department of Business and Engineering Administration under the direction of Professor Erwin H. Schell, '12.

The decision of the foundation to increase the grant is a response to the growing demand of industry for executives with enlightened social and economic objectives. It is also based on the results of a study of the progress of the previous fellowship holders. Tests indicate that the year's training at the Institute gives these young men a greatly increased sense of the responsibility of business leaders for social welfare, according to Harold S. Sloan, Foundation Director.

"Trained mainly in engineering during their undergraduate days at college, and later dealing in their industrial life mainly with technical problems, young executives are frequently unprepared to cope with the social and economic aspects of their managerial duties," Mr. Sloan said. "Their year's study at the Institute supplies this lack, our appraisal shows. At the close they not only have a broader background of economic theory but a keener appreciation of some of the human problems involved. They understand better the viewpoint of labor and see their way more clearly amid com-



A name directly familiar to many Alumni — that of the genial Secretary of their Association — appears in different guise in the third column from the right in this reduced picture of a document which reads in translation thus:

Mining Institute of Japan
This certifies that
Prof. Charles E. Locke
was by unanimous vote at the
53rd Annual Meeting, according
to Article II, Section 6 of the
Constitution, elected an
Honorary Member
of the Institute.
Hidenosuke Sano
President

plex industrial and financial relationships. The Alfred P. Sloan Foundation is interested in this project as one phase of the broad program for the increase and diffusion of economic knowledge."

Dean of Humanities

ROBERT GRANVILLE CALDWELL, United States Minister to Bolivia and former Minister to Portugal, has been appointed dean of humanities at Technology and will join the academic administration of the Institute next September. He will have administrative responsibility for the Division of Humanities, which includes the Departments of English and History and Modern Languages, and for certain aspects of Economics and Social Science. He will also direct, with the aid of a Faculty committee, the wide variety of cultural courses which, as general studies in the fields of literature and the fine arts, history of civilization, history of science and thought, and social science, have long been part of the Institute's regular curriculum.

"Dr. Caldwell," said President Compton in announcing the appointment, "will bring to Technology qualities of leadership and the advantages of broad educational experience which admirably fit him for advancing the Institute's program of training scientists, engineers, and architects capable of contributing to the solution of human problems in a changing social order. The positions of great social responsibility now occupied by scientists and engineers emphasize the need for constant attention to two aspects of their education: The first is development of a high sense of responsibility and understanding in social matters, so that the goal of technological success is accompanied by an unselfish desire to aid in the improvement of human relationships. Second is development of those spiritual qualities that bring permanent satisfaction in living. At Technology a greater portion of the students' time than at any other engineering college has for many years been set aside for cultural and social studies. It is the responsibility of the dean of humanities to consolidate the work in this important field and to assure the most fruitful attention to this aspect of the Institute's curriculum."

Dr. Caldwell was born in Bogota, Colombia, in 1882, the son of an American Presbyterian minister, Dr. Milton E. Caldwell, and Susanna (Adams) Caldwell. He was graduated *summa cum laude* in 1904 from the College of Wooster, at Wooster, Ohio. His first position took him to Lahore, India, where he was an instructor in history and English literature at Forman College, Punjab University. After 1906 he specialized in history for a year at the Auburn Theological Seminary and then became instructor in history and economics at Huron College, Huron, S. D. In 1909 he returned to his alma mater, the College of Wooster, for a year to teach philosophy and psychology. Then followed advanced studies as a fellow in history at Princeton University, which granted him the degree of doctor of philosophy in 1912. Between 1912 and 1914 he was instructor and then professor of politics and economics at the College of Wooster. In 1914 he started a 19-year career as professor of history at Rice Institute in Texas, and in 1918 he was appointed dean of that Institute.



© Harris and Ewing

ROBERT G. CALDWELL

Dean of the Division of Humanities

Dr. Caldwell carried on graduate studies at Columbia University and the University of Wisconsin in summer sessions between 1909 and 1914. During the summers of 1929, 1931, and 1932 he was visiting professor in the graduate school of Columbia University, and he held a similar position at the University of Chicago during 1930.

On the basis of his long career as a student and teacher of history, constitutional law, sociology, and economics, and his broad knowledge of human problems gained during travel in various countries, Dr. Caldwell was well prepared to take over the duties of minister of the United States to Portugal in 1933. In 1937, he returned to the continent of his birth as the United States minister to Bolivia.

His wide experience has also permitted Dr. Caldwell to do considerable writing, principally in the field of history. Among his major works are: "A Short History of the American People," "James A. Garfield—Party Chieftain," and "The Lopez Expeditions to Cuba." He is also the author of sections of several other works on history, economics, and politics, and of a number of pamphlets. In addition, the "Dictionary of American Biography" contains 17 biographical sketches written by him.

In 1915, soon after joining the staff of Rice Institute, Dr. Caldwell married Edith Jones of Columbus Grove, Ohio, likewise a graduate of the College of Wooster. Of their three children, Alice Wyman was graduated from Mount Holyoke College in 1938; Robert Granville is a student at Yale University; and Janet is studying at Mount Holyoke College.

On the Ballot

NOW going into the mails to more than 30,000 voters are ballots for the annual election of officers to represent the great body of Alumni of the Institute. This year the National Nominating Committee, composed of J. Lloyd Wayne, '3d, '96, Ernest B. MacNaughton, '02, Redfield Proctor, '02, Edward L. Moreland, '07 (chairman), George M. Gadsby, '09, Donald N. Frazier, '11, Frederick W. Barker, '12, Charles H. Chatfield, '14, Alfred T. Glassett, '20, and William J. Sherry, '21, presents the following slate:

President of the Alumni Association: Frank B. Jewett, '03, VI, American Telephone and Telegraph Company, New York, N. Y. *Vice-President:* A. Warren Norton, '21, XV, Omara and Ormsbee, Inc., Boston, Mass. *Executive Committee:* Chester A. Corney, '14, VI, Boston Edison Company, Boston, Mass.; Walter G. Whitman, '17, X, Department of Chemical Engineering,



FOR THE PRESIDENCY

... of the Alumni Association, sole nominee is Frank B. Jewett, '03, President of the Bell Telephone Laboratories, life member of the Institute's Corporation since 1934. An instructor in physics and electrical engineering at the Institute in his early days, as vice-president in charge of development and research of the American Telephone and Telegraph Company he is in the van of industrial and engineering progress. Yet retrospect, too, counts him among its supporters as president of the New York Museum of Science and Industry. Among the numerous honorary awards which have been conferred upon Dr. Jewett, the most recent are the Faraday Medal of the Institution of Electrical Engineers in London and the John Fritz Medal, awarded jointly by the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers

M.I.T. Representatives at Large on the Alumni Council: John F. Ancona, '03, II, construction engineer, Rochester, N. Y.; Henry A. Wentworth, '05, VIII, trustee, Boston, Mass.; Robert C. Doremus, '14, II, Detroit Ice Machine Company, Detroit, Mich.; William H. McAdams, '17, X, Department of Chemical Engineering, M.I.T.; William W. Russell, '22, XV, Homer T. Brown, Inc., Brookline, Mass.

Nominations for term membership on the governing body of the Institute — the Corporation — are made by the Nominating Committee in addition to its nomination of the foregoing officers of the Association. The candidates for the three vacancies this year are: Philip W. Moore, '01, II, Poor and Company, Chicago, Ill.; Charles Edison, '13, IX, The Assistant Secretary of the Navy, Washington, D. C.; H. B. Richmond, '14, VI, General Radio Company, Cambridge, Mass.

The Nominating Committee itself is made up of members elected by districts, whose terms are so staggered that only a third of the Committee changes at one time. The terms of Messrs. Chatfield, Frazier, and Wayne are expiring this year, so that Districts 3, 6, and 7 — the districts which they have served — are represented by the following nominees, from whom one for each district will be elected by the Alumni: *District 3:* Alfred W. Hough, '19, XIII, General Electric Company, Pittsfield, Mass.; William H. Jones, '29, X, Arnold Print Works, North Adams, Mass. *District 6:* Richard Mommers, '98, V, American Sugar Refining Company, Baltimore, Md.; Allen B. McDaniel, '01, IV, The Research Service, Washington, D. C.; Walter J. Beadle, '17, II, E. I. du Pont de Nemours and Company, Inc., Wilmington, Del. *District 7:* Mitchell Mackie, '05, VI, Central Investment Company, Milwaukee, Wis.; Edward Pennell Brooks, '17, XV, Sears, Roebuck and Company, Chicago, Ill.; Franklin Fricker, '25, XV, Ethyl Gasoline Corporation, Detroit, Mich.

Training Pilots

COÖPERATING in the program of the Civil Aeronautics Authority for training civilian airplane pilots, the Institute has undertaken a program of ground instruction and flight training for 20 students. The project was started as a result of conferences with officials of the Civil Aeronautics Authority, which requested the Institute to establish an experimental program to determine the long-range possibilities of President Roosevelt's plan to train 20,000 pilots a year. This nation-wide trial program is being carried out by the Authority with the coöperation of 13 educational institutions qualified to give such instruction. Funds for the program are being supplied by the National Youth Administration.

The Institute made an initial selection of some 70 students, and out of this group the Civil Aeronautics Authority chose the final 20. Technology is providing ground-school training, while flight instruction is being given under C.A.A. supervision by a school at a local airport. For ground training, which includes instruction in civil air regulations, navigation, and meteorology, students have the advantage of the resources of Technology's Course in Aeronautical Engineering, the oldest



M. I. T. Photo

Stein

ON THE CORPORATION

... the Alumni nominate for term membership (in the usual order) Charles Edison, '13, The Assistant Secretary of the Navy and President of Thomas A. Edison, Inc.; Philip W. Moore, '01, Vice-President and Treasurer of Poor and Company and its various subsidiaries, Chicago, Ill.; and the retiring President of the Alumni Association, H. B. Richmond, '14, Treasurer of General Radio Company, Cambridge, Mass., past President of the Radio Manufacturers Association, and term member of the Institute's Corporation from 1933 to 1938

in this country. Instruction is given by members of the staff in that Course. The program is administered by a committee of three members of the Faculty in Aeronautical Engineering. Professor Richard H. Smith, '18, is chairman, and the other members are Professors Charles S. Draper, '26, and Otto C. Koppen, '24.

Flight training will include eight hours of dual instruction and 27 hours of dual observation and solo flying, during which students will solo one hour for every half hour of dual operation. Successful completion of the training program will entitle students to take examinations for licenses as civilian pilots.

Participation in this government-sponsored training at the Institute was limited to sophomores, juniors, seniors, and graduate students whose scholastic records indicated their ability to take the aeronautical training in addition to their formal courses at M.I.T. The program is given at no expense to students except a nominal sum for personal insurance and medical examination.

Mathematics by Machines

ESTABLISHMENT of a center of mathematical analysis to direct the use of new types of highly comprehensive calculating machines at the Institute has been made possible by a grant of \$45,000 by the Carnegie Corporation of New York. The Center of Mathematical Analysis is being founded primarily for the purpose of encouraging and assisting technological advance in all fields by making available to scientific institutions and industry economical means of carrying out intricate mathematical processes. The Center will also engage actively in the development of new machines and the analytic methods using them.

Recommended by the Committee on Scientific Aids to Learning of the National Research Council, the project includes the organization of a staff to operate the

various machines. The program is to be centered in the Institute's Department of Electrical Engineering, under the direction of Professor Samuel H. Caldwell, '25, and will be located in a section of the new Rogers Building.

As the scope of science and engineering has been developed and extended, the problems arising have increased in complexity, and the associated mathematical labor has grown proportionately. Ordinary methods of analysis have either failed completely to keep up with this development or have given results only at the expense of much tedious routine computation. By means of the more recently developed types of machines, direct attack on problems is frequently possible and the routine labor is eliminated. Such elimination of human labor not only has provided time for more profound analysis but in many cases has stimulated studies which otherwise would have been entirely too laborious.

An example of the power of the machine method may be found in the study of cosmic radiation, which has been carried on for more than five years. Without the aid of the differential analyzer it is probable that very little of the present theoretical advance would have been made. It is estimated that one hour of work with the machine can be substituted for at least 20 hours of work by a skilled mathematician.

Vannevar Bush, '16, who directed development of the differential analyzer, once likened the operation of that machine to the human process of thinking, since one aspect of thinking involves the combination of observations into relationships. The analyzer "thinks" in the manner in which an adding machine "thinks." This is the type of thinking that is repetitive and therefore properly is given to machines, permitting the operator to do the nonrepetitive thinking which induces progress.

Equipment which will be available for use through the Center of Mathematical Analysis will include the original differential analyzer and a new, larger, faster,



M.I.T. Photo

President Compton places a time capsule of brass beneath one of the 18-ton magnets of the cyclotron made available to the Institute through a grant from the John and Mary Markle Foundation as reported in *The Review* for July. Professor Robley D. Evans, shown with Dr. Compton, will direct the program of research into artificial radioactivity which will utilize the cyclotron. In the capsule are various publications of the Institute, scientific papers dealing with the investigations carried on with such machines, and a document, signed by Dr. Compton and members of the research staff working on the project, which is engrossed in the copperplate calligraphy of Miss Madeline R. McCormick of the Alumni Association's staff

and more accurate differential analyzer which is now under development at M.I.T., both of which make possible the solution of many difficult problems involving differential equations and integrations. Other available equipment includes the cinema integrator, the network analyzer, the simultaneous calculator, a group of punched-card machines, and miscellaneous types of commercial and special machines. Organization of the Center of Analysis will be started at once, and the Center is expected to be in operation next fall.

Cracking Glass

ULTRAHIGH-SPEED photographs revealing the fact that glass cracks at the rate of nearly a mile a second have led to the establishment at the Institute of a \$3,000 fellowship for further photographic studies which are expected to point the way to improvements in the quality of glass through new knowledge of the behavior of the material during fracture.

Frederick E. Barstow, '38, of Midland, Mich., as the recipient of the fellowship, will continue the research work which has led to his degree of master of science in

the Department of Physics at Technology. The program will be supervised by Professor Harold E. Edgerton, '27, who is well known for the development of methods of high-speed photography which have permitted the making of accurately timed exposures.

Some preliminary experiments on fracturing glass were made last year by Professor Edgerton, and an extension of these studies, suggested by the Hartford Empire Company, led to establishment of the fellowship, which is being donated by six glass manufacturing companies, each contributing a share to the fund. They are: Owens-Illinois Glass Company, Hartford Empire Company, Pittsburgh Plate Glass Company, Hazel-Atlas Glass Company, Libbey-Owens-Ford Glass Company, and Corning Glass Works.

Already Barstow's work has included the taking of pictures of shattering plates of glass with camera exposures of less than a millionth of a second. These pictures "stop" the action of a splintering piece of glass and reveal the complicated, asymmetrical pattern at various stages in the process. (See *The Review*, November, page 8.) The results check similar experiments by German scientists, who have been breaking glass with bullets.

To the scientist, glass presents a peculiar riddle because it is actually stronger than steel under normal conditions of compression. These studies on the brittle nature of glass are being carried out in order to discover just why and how glass breaks when a shock is applied.

For Worthy Action

UNUSUAL service by Alumni whose efforts have been notable in maintaining class, club, or other alumni organizations; in participating in the selection of students; in assisting through alumni means in extending the usefulness, influence, and prestige of the Institute; or in activity in other Institute and alumni affairs is to be accorded public recognition through the conferring of annual Alumni Awards. The awards themselves, in the form of certificates, will go to Alumni elected by the Alumni Council upon nomination by a committee of selection, who will be guided by some 10 or 11 categories of distinction. A determining factor in the committee's work will be the seeking out of active Alumni who are far distant from the Cambridge area and whose contributions might not receive recognition through election to office. This citation is destined mainly for the infantry troops rather than the G.H.Q. of the alumni army.

Selected officers of local Technology associations whose activities in behalf of their clubs have extended over ten years and have been of outstanding importance are, for example, to be regarded as logical recipients of the awards. Class officers who are similarly noteworthy in duration and quality of service constitute another group. So do selected Honorary Secretaries, Alumni Fund workers, members of Alumni Advisory Councils on Undergraduate Activities, retiring chairmen of the Alumni Fund Board, selected members of the Alumni Council or of Departmental Visiting Committees, Alumni who have participated in the awarding of regional scholarships and have worked with the Honor-

ary Secretaries in the selection of students, and alumni members of the Corporation whose services prior to, or during, their membership in the Corporation have been of significance and value in the alumni activities of the Institute. In addition, naturally, Alumni who have performed conspicuous and unselfish service in Technology affairs in categories not described may well receive the award; in some awards, moreover, the ten-year provision may be waived.

Thus may be summarized the conclusions of the committee of the Association, headed by Samuel C. Prescott, '94, and including Charles E. Smith, '00, and Edward L. Moreland, '07, who reported at the January meeting — the 203d — of the Alumni Council and whose report was unanimously accepted. The committee presented deliberations upon methods and machinery for selection of recipients of the awards, recommending that a committee consisting of five ex-presidents of the Association function at first as a nominating clearinghouse body and that later a selection committee be made up of recipients of the awards. Careful effort to avoid the more or less automatic bestowal of the awards upon outgoing officers of the Association was advocated.

A. Warren Norton, '21, chairman of Alumni Day, reporting briefly at this same Council meeting, said that the theme for the day — the technology of national defense — would be discussed by prominent speakers, assuring a stimulating and informative session. Beyond that, he declined to be committed or to tip his hand.

Principal speaker of the evening was David McCord, director of the Harvard Alumni Fund, who discussed alumni funds in general and the Harvard system in particular. The Association's Committee on the Establishment of an Alumni Fund at Technology reported through John E. Burchard, '23, its chairman, the report being laid on the table for further discussion at a subsequent meeting.

Honored

AWARDS of \$2,500 each, in recognition of exceptionally distinguished scientific achievement were presented on February 3 by the Research Corporation to Vannevar Bush, '16, now President of the Carnegie Institution of Washington, and Hugh S. Taylor, head of the department of chemistry at Princeton University. Dr. Bush was honored for the development of mathematical computing machines at the Institute. Professor Taylor received the award for notable contributions in chemical catalysis. The presentations were made at a dinner of the board of directors of the Research Corporation held at Columbia University.

Presentation of Dr. Bush for the award was made by President Compton. Speaking of Dr. Bush's contribution to the solution of complicated mathematical problems, Dr. Compton said: "Machines have taken much of the burden of manual labor from mankind and have enabled him to perform feats which would have been utterly impossible without mechanical aid. It has not been generally realized that machines may offer the same type of assistance and increase the range of man's abilities in the intellectual field in much the same way. But in the realm near the border line of thought where

the great advances of science and engineering are being made, man's progress in many directions has been limited by his ability mathematically to analyze the results of his thinking or the working of his instruments. Many an important scientific hypothesis or engineering development can be imagined but is given up as hopeless because of the years and years of mathematical computation which would be involved. For such purposes the new machines developed by Dr. Bush and a group of younger associates at M.I.T. have broken down the barriers to further progress."

It is these machines which will implement the Center of Mathematical Analysis, establishment of which is announced on page 219.

Meteorological Award

FOR an outstanding contribution to the science of weather forecasting during 1938, Jerome Namias, '33, research associate at the Institute, has been awarded the Meisinger Award of \$100 by the American Meteorological Society. The award, which was presented for the first time this year, was established in memory of Dr. C. Leroy Meisinger, a pioneer in the use of balloons to study the nature and behavior of the upper atmosphere. Born in 1895, in Nebraska, he entered the United States Signal Corps Meteorological Service in 1918 and became an expert free-balloon pilot. He was especially interested in studying the nature of storms in the upper atmosphere. He met his death in 1924 at the early age of 29 when his balloon was ignited in a thunderstorm during which he had gone aloft for observations.

Namias' research consists of a new method of analyzing the temperature, pressure, and humidity measurements made by means of airplane flights and instrument-equipped balloons. The method makes it possible to follow currents of air from day to day by means of their moisture and temperature characteristics. This tracking is accomplished by drawing weather maps representing not fixed horizontal surfaces in the atmosphere but surfaces along which air is constrained to flow. Such surfaces, while nearly horizontal, are continually shifting in position, and the air particles tend to move along them. From a knowledge of the moisture content of such surfaces, meteorologists are able to distinguish the moist and dry tongues of air which are continually curling around one another, forming flow patterns and eddies of different sizes, similar to the eddies formed in streams of water. Information of this sort greatly increases the accuracy of weather forecasting.

Namias is the son of Mr. and Mrs. Joseph Namias of Fall River, Mass. He has been a member of the research staff of the Institute's meteorological laboratory for several years, devoting himself to the studies of the upper atmosphere which resulted in his important contribution to weather forecasting.

Quality of Hand

BECAUSE the "feel" or the "hand" of a textile fabric is an important factor in its sales value, a program of coöperative research on the subject is to be carried out at the Institute under the auspices of the

American Association of Textile Chemists and Colorists. The work is to be done under the direction of Professor Edward R. Schwarz, '23, of Technology and Kenneth H. Barnard, '12, chief chemist of the Pacific Mills.

Although thousands of yards of goods are sold primarily upon the feel or hand of the fabric, very little has yet been done to standardize methods of determining or measuring this quality. However, Professor Schwarz has done considerable work which is expected to apply in this field.

The researchers propose to begin their investigation by making a survey of the literature on the subject and studying the various instruments and methods used for measuring those physical properties which influence the feel of textiles. A study of the psychological factors which give fabrics a certain feel desirable to a user may also be included in the research. It is hoped that standard testing methods may eventually be applied, and that numerical values can be assigned for the effects of adding different chemical finishes and resins to a cloth. It is also hoped that numerical values may be established for the designation of the permanency of such finishes during wear and for average cleaning processes.

Visiting Committee Report

IN slightly condensed version, the report of the Corporation's Visiting Committee for the Department of Physics is printed below as one more in the series of expert commentaries which The Review presents from time to time upon the work of the Institute's Departments.

DEPARTMENT OF PHYSICS *

EXPRESSING its belief that excellent work is being done by the Department, the Committee reports discussion of various problems and visits to the new high-voltage research laboratory, the cyclotron building, and the high-voltage, high-pressure installation that will ultimately go to the Massachusetts General Hospital (see page 199).

The first of these laboratories has been removed from its original installation at Round Hill and reinstalled on this campus, in accordance with the recommendation of the Visiting Committee in June, 1937. The high-voltage installation was actually operated for the Committee and is ready for regular use.

The cyclotron is a coöperative project between the Physics Department and certain members of the medical profession. Its cost will be about \$30,000 and the building to house it has cost \$16,000. There is available from the Markle Foundation \$18,000 per year for three years to finance a joint Harvard Medical School-M.I.T. project utilizing the cyclotron in medical research. Its use, when ready, can relieve the high-voltage installation of the necessity for making artificially radioactive substances, thus releasing the latter for other research problems in which the Department is engaged.

* Members of this Committee for 1938-1939 are George E. Whitwell, '15, Chairman, Alfred L. Loomis, Arthur H. Compton, Daniel F. Comstock, '04, Harlow Shapley, Percy W. Bridgman, and William D. Coolidge, '96.

The spectroscopy wavelength project of the Department, which has had W.P.A. assistance to the extent of some 108 individuals, largely for clerical work, is now in a position permitting publication of a preliminary list of approximately 100,000 principal wavelengths. The Corporation is now being asked for \$9,000 to underwrite its publication by the Technology Press. This list will be a valuable contribution, as it will be by far the best available.

The Committee visited the upper-class and graduate physics laboratories. It did not see the freshman and sophomore laboratories inasmuch as recommendations of a former Visiting Committee respecting them have been put into effect. The upper-class laboratories seem adequate, except those for nuclear physics and for instruction of juniors in the Department. Here there is bad overcrowding due to the increasing number of students desiring to take the work involved.

The Visiting Committee makes two recommendations: (1) That the spectroscopy wavelength project with W.P.A. assistance be continued with the Institute participating approximately as at present. This work has been well started, has valuable momentum, and offers much for future accomplishment. (2) That the proper authorities give consideration to the problem of correcting the condition of overcrowding in the nuclear physics and junior physics laboratories.

Prizes

THE annual prize of \$100 offered by the Boston Society of Architects to students in the schools of architecture of Harvard University, Technology, and the Boston Architectural Club has been awarded to John G. Kelley of New York City, a graduate student at the Institute.

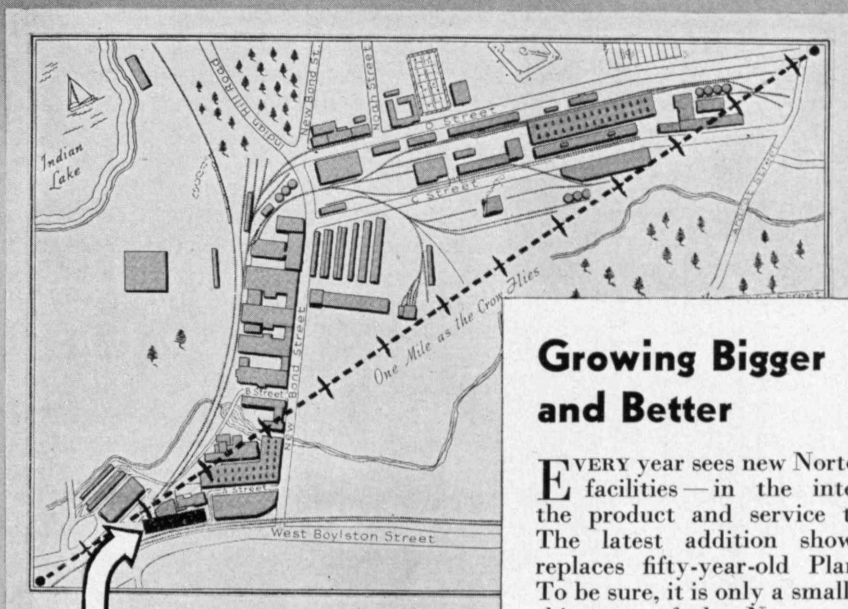
Kelley, whose design was one of 55 submitted, is the fourth successive M.I.T. student to win the annual contest. After receiving his bachelor's degree at Princeton University last spring, he came to Technology to study for the master's degree in architecture.

This year's design subject was "A Dance Pavilion in a Municipal Park." For the purposes of the problem the contestants were to imagine that a city of importance had a beautiful wooded park area where a dance pavilion was needed to relieve overcrowded conditions.

Alfred Sweeney, Jr., '38, of Auburn, Maine, a graduate student in the School of Architecture, has won the Emerson Prize of the Beaux Arts Institute of Design. William W. Caudill of Stillwater, Okla., also a graduate student, won second place in the competition, in which 129 students of the leading architectural schools of the country were entered.

The problem for this year's Emerson Prize, one of the distinguished awards in architecture, was the design of an entrance gateway and inclosure for a municipal museum devoted to science and industry. The winning design showed a tall, streamline, duralumin pylon against a massive porphyry background with symbolical figures in bas-relief.

The Emerson Prize, gift of Dean William Emerson, has been in competition for many years, and this is the first time it has been awarded to a Technology student.



Growing Bigger and Better

EVERY year sees new Norton plant facilities—in the interest of the product and service to users. The latest addition shown here replaces fifty-year-old Plant One. To be sure, it is only a small spot on this map of the Norton plant at Worcester but it is another important step in a modernization program to still further improve both Norton quality and Norton service.

Perhaps the greatest of all Norton assets is the reputation that has been built for Norton service in the world's important plants both large and small—wherever abrasive products are used—wherever grinding machines are employed.

NORTON ABRASIVES

NORTON PRODUCTS

Abrasives

Grinding Wheels

Saw Gummars

Coping Wheels

Abrasive Bricks

Pulpstones

Grinding Machines

Lapping Machines

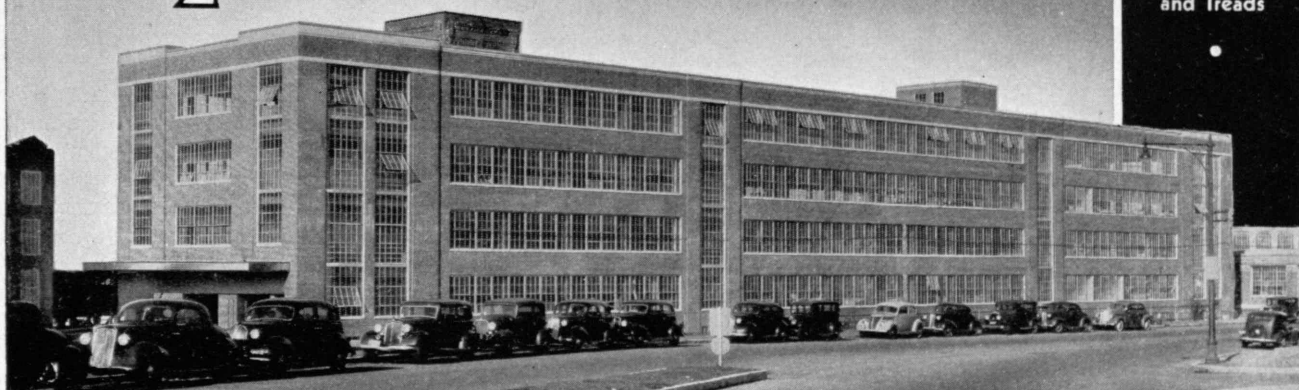
Refractories

Laboratory Ware

Sharpening Stones

Coated Abrasives

Non-slip Tiles and Treads



NORTON COMPANY • WORCESTER, MASSACHUSETTS, U. S. A.

New York • Chicago • Detroit • Cleveland • Pittsburgh • Philadelphia • Hartford
Hamilton, Ont. • London • Paris • Wesseling, Germany • Corsico, Italy
BEHR-MANNING DIVISION, TROY, N. Y.

—for Profitable Production Milling

... Nos. 10 and 12
Plain Milling Machines
have *all* the features

..... **A PIONEER**
in Electrically Controlled milling
machines—the No. 12 (followed
by the No. 10) established the
soundness of the Brown & Sharpe
design in applying electrical con-
trols to machine tools.



Specifications on request
Brown & Sharpe Mfg. Co.
Providence, R. I.

BROWN & SHARPE



Samson Trade Mark

Samson Cordage Works

Boston, Mass.

Herbert G. Pratt, '85, Chairman of the Board

Mills at Shirley, Mass., Anniston, Ala.,
and Icard, N. C.

Manufacturers of braided cords of all kinds, in-
cluding sash cord, clothes line, trolley cord, signal
cord, arc lamp cord, shade cord, Venetian blind
cord, awning line, and cord for many other pur-
poses, also cotton twines.

SAMSON SPOT CORD



Trade Mark Reg. U. S. Pat. Off.

Our extra quality, distinguished at a glance by our trade
mark, the colored spots. Especially well known as the most
durable material for hanging windows, for which use it
has been specified by architects for more than forty years.

THE TREND OF AFFAIRS

(Continued from page 204)

high-octane gasolines. A logical extension of this method would require that Diesel engines, for example, be increased in number to the point where they can absorb about all of the Diesel fuel present in a year's production of crude. Some observers, however, insist vigorously that we have now no uneconomic uses of petroleum.

Here, then, in the two aspects of operating economy and husbanding of resources, is background for the explosion wave which now passes as a curve of progress in the refining industry, and for the frantic interest centering around the new catalytic processes of cracking petroleum devised by Eugene Houdry and brought into operation by Socony-Vacuum and the Sun Oil Company. Behind a bulwark of 96 patents in this country, more pending, and corresponding protection abroad, these organizations are erecting ten plants to be finished by midyear at a cost of about \$35,000,000. Citations of terms only slightly related are not very significant, yet there is interest in balancing this figure against the \$8,000,000 destined by Du Pont for plants with which to produce nylon, the synthetic fiber widely regarded as among the most important industrial achievements of 1938 (see page 205).

Expectations from this new development in oil refining are on the same opulent scale as allotments for construction. In the process, almost half the charge that passes through the catalyst is converted into gasoline of high antiknock value, while the gas oils which form the bulk of the remainder can again be cracked by catalytic or thermal methods to produce more gasoline. By appropriate processing, about half of the gasoline yield from the volatile fraction of practically any crude has octane numbers ranging from about 77 to 81. The rest of the yield is a more ordinary, but good, gasoline, involving only a modest gas and coke loss. Moreover, it is easy to adjust the process for withdrawal of a readily salable furnace oil rather than the heavy, tarry residue that usually plagues refiners. Compared with the average yield of some 45 per cent of gasoline from crude oil, the figures for the Houdry process shine handsomely, for though thermal cracking can match Houdry results in octane number on many crudes, it does so only at a sacrifice of yield. Increasing the agitation of refinery financiers are statements that the same equipment can produce gasoline for either the automotive or aviation fields, that catalysts are rugged and long-lived, that pressures and temperatures are relatively low for a catalytic process, and that equipment costs are in line with those for other up-to-date cracking means.

Claimed for the Houdry process is the ability to produce gasolines meeting the acid-heat requirements, gum and oxidation tests for commercial aviation. In addition to an octane number of from 76 to 78, they have high susceptibility to tetraethyl lead. Most high-octane gasolines, however, including those produced by the Houdry method, are made up in part of unsaturated compounds which tend to absorb oxygen from the air to form gums. Though this (Concluded on page 226)

Younger brothers of your telephone



This one helps entertain and instruct millions

Did you know that talking pictures are a product of Bell Telephone Laboratories research? And that the majority of pictures today are both recorded in the principal studios and reproduced in thousands of theatres by means of Western Electric sound equipment?

(Above is a section of film, with the sound track at left of picture).



This one helps the hard-of-hearing to hear

If your hearing is impaired, you'll be interested in Western Electric's new Ortho-Technic Audiphone. Another outgrowth of Bell System research, this instrument is built on entirely new principles in hearing aid design. It does things no previous aid could do. It will bring easier hearing and greater happiness to thousands.

This one helps people to fly on schedule

When you travel on any of the nation's major airlines, the air-minded brother of your Bell Telephone flies with you. Western Electric radio telephones keep pilots and airports in touch—help to



make possible today's splendid airline service. More and more private planes, too, are being equipped with the flying telephone.



This one helps to catch more criminals

When police use Western Electric radio, arrests increase and crimes decrease. Your Bell Telephone makers pioneered in the police radio field. Today Western Electric equipment is giving added protection to 45 million people. Has your community this law enforcement aid?



All these benefits and more came out of the telephone

Since 1882 Western Electric has been the manufacturer for the Bell System, and this is still its major activity.

Experience in the field of sound-transmission has frequently enabled the Company to apply its skill in the making of other sound equipment that plays an important part in daily living.



Western Electric ... made your
BELL TELEPHONE

THE TREND OF AFFAIRS

(Concluded from page 224)

process can be delayed by the addition of inhibitors — the first use of which in petroleum products was developed in Institute laboratories — fuels destined for war planes must be able to lie in storage ready for instant use tomorrow or three years from tomorrow. High-octane fuels involving unsaturated compounds, then, seem most useful as blending agents for automotive and, perhaps, commercial aviation use, thus releasing for military purposes the saturated compounds which can be kept indefinitely without whitening official hair. At present most of these saturated fuels are being produced synthetically from butenes (obtained from by-product refinery gases) by comparatively expensive polymerization and hydrogenation processes.

Consequently, much importance is attached to a method announced by Dunstan and his colleagues of the Anglo-Iranian Oil Company and already in commercial use, which gives far greater yields by the condensation of olefines with isoparaffins of low molecular weight in the presence of concentrated (97 per cent) sulphuric acid. To an engineer who has not closely followed the progress of petroleum chemistry, this proceeding may occasion astonishment. While the olefins (such as ethylene, propylene, the butylenes) are known to be very reactive, the paraffins (such as methane, propane, butane) have long been given up as hopelessly inert. Yet Dunstan has directly combined olefins with isobutane under surprisingly mild conditions to form what is apparently today the superlative aviation fuel if all factors are considered. Good yields of over 90-octane isoparaffins have been obtained from the reaction of the butylenes of cracking-plant gases with a concentrated isobutane fraction. Modern distillation techniques make such fractionation an entirely practical operation.

The chief importance of the Houdry process as regards conservation is not so much its ability to increase the efficiency of the gasoline derived from a barrel of crude, by producing a greater proportion of high-octane fluid, but the fact that it also increases the total amount of gasoline secured from a barrel of crude. An additional, although smaller, conserving effect may be exerted through its increased ability to change the ratio of furnace oil to gasoline, thus eliminating the need for, and the attendant losses from, piling up large stocks of furnace oil during the summer, large stocks of gasoline during the winter. By its relative lack of sensitivity to the nature of the petroleum being fed to it, the catalytic method may perhaps extend reserves by using crudes not fit for other processes.

The Dunstan method, on the other hand, will exert part of its conserving effect by making better use of gases formed in huge quantities by cracking plants and oil fields, and normally worth little above their fuel value. Egloff and Lowry have estimated that if all of such gases suitable for polymerization into motor fuels were so utilized, 360,000,000 barrels of high-octane fuel, or as much gasoline as is now made by cracking, could

be produced. By hydrogenation — not the Dunstan method — 42,000,000 barrels of their yield could be converted into iso-octane, a quantity tremendously larger than present consumption. Plants now built or building for making fuels by polymerization will have a capacity of nearly 23,000,000 barrels per year, it is said, and will be the equivalent of the gasoline that would normally be made from 100,000,000 barrels of crude.

Unless peace — what we have of it — is maintained, however, discussions of conservation for other generations will become meaningless verbal scuffles. In the event of large-scale conflict in western Europe, J. H. Carmichael, writing in the *New York Times*, has predicted that the democratic nations would probably face a "rather acute shortage of aviation fuel" for the first few months. War needs could easily increase consumption of such fuel ten- or fifteenfold, and it takes months to erect new refining equipment. It would also be prudence on the part of this country to build up its own reserves, thus absorbing with present facilities, whatever surplus is now being exported or could be obtained by curtailment of private and commercial flying. If the United States is to play the role of armorer to the world — and it may have little choice — the availability for military aviation of large supplies of saturated high-octane compounds can have profound effects. Since such fuels are essential in obtaining maximum performance from planes, it is quite conceivable that man-made isoparaffins could determine air supremacy, and thus in some measure, the future culture of western Europe.

HOW ABOUT THE HOUSE?

(Continued from page 212)

answered the question, and more than half were completely satisfied. Seventy-five of the 80 were satisfied with the site they got; 13 had had to compromise on the number of rooms; seven had failed to achieve their desires in garage capacity, but usually had too much rather than too little. The exterior had thwarted rather more. Three who wanted Modern or mild Modern got Colonial. Three who wanted English got Colonial. But five others who wanted Colonial got either Spanish or English or "plain" or "mongrel." The howl was somewhat more strident on matters of kitchen, heating, and bathroom equipment, but this may be more conveniently discussed later.

Principally to evoke symptomatic responses, four proposals of so-called Modern characteristics were made. None was greeted with anything resembling cheers. Few could contemplate the disappearance of the fireplace with anything less than horror; but few more were able to conceive that a cellarless house could be well heated or to imagine where the storage space was to be provided with the cellar missing; there was less aversion to a combined living-dining room, but just over half of those answering demurred to this idea. Least objection of all was registered to the combined garage for several neighbors, but even this was unpopular.

Some of the comments on this point had salt. One reader asked us: "If fireplaces are omitted, where can a fellow spit?" Another (Continued on page 228)

ESTABLISHED 1818

Brooks Brothers,

CLOTHING,

Men's Furnishings, Hats & Shoes

MADISON AVENUE COR. FORTY-FOURTH STREET
NEW YORK

Brooks Brothers' Representatives Visiting Fifty-three Cities

Fifty-three cities all over the United States will be visited by Brooks Brothers' Travelling Representatives this Spring. Brooks Suits, Overcoats, Country Clothes, English Hats and Shoes, Shirts, Neckties and other accessories bearing the Brooks label, may be ordered from samples which offer a really wide range of choice.

We shall be glad to advise you when one of our Representatives will visit the city nearest you. Write to our Madison Avenue store, New York

BRANCHES

NEW YORK: ONE WALL STREET

BOSTON: NEWBURY COR. BERKELEY STREET



INFORMATION ON M. I. T.

THE TECHNOLOGY REVIEW BUREAU exists to supply authoritative information to anyone interested in details regarding the Massachusetts Institute of Technology. It serves as a clearing house for inquiry and aims to further the spread of exact information regarding entrance requirements, outline of courses, subjects of instruction and other information which may be of aid to the students considering undergraduate or graduate study at the Institute.

The Institute publishes a variety of bulletins, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

Ask for the following pamphlets by their descriptive numbers

1: For general information, admission requirements, subjects of instruction, ask for Bulletin 1.

2: For announcement of courses offered in Summer Session, ask for Bulletin 2.

3: For information on courses in Architecture, both Undergraduate and Graduate, ask for Bulletin 3.

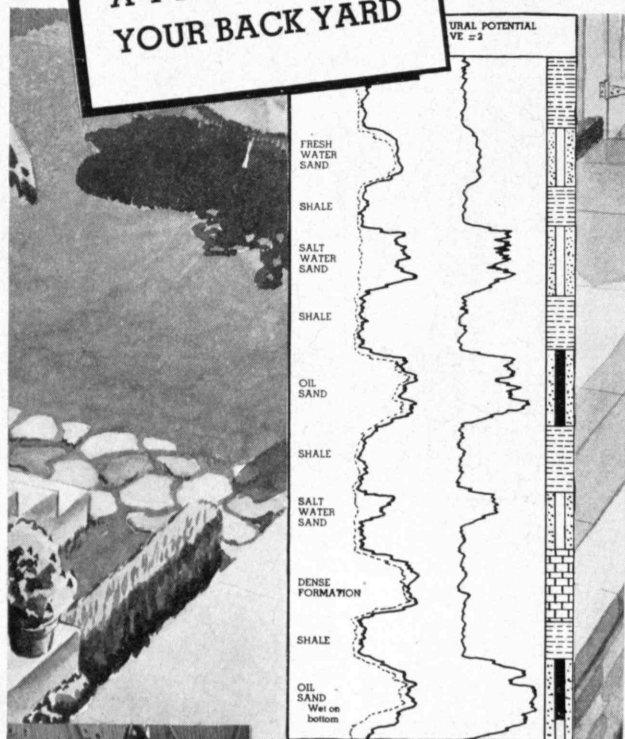
4: For a popular presentation of Educational Opportunities offered at M.I.T., ask for Bulletin 4.

All inquiries sent to the address below will receive prompt attention

THE TECHNOLOGY REVIEW BUREAU

ROOM 3-219, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.

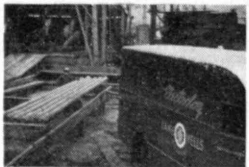
THIS MIGHT BE
A PICTURE OF
YOUR BACK YARD



Through this electrode Nature records her secrets for accurate interpretation.



1500 feet of formation is accurately charted by Lane-Wells Electrolog.



Electrolog Truck at the derrick in a busy field.

Your own back yard might look like this—to a petroleum engineer. It's true the picture isn't beautiful, but it is an accurate chart of sub-surface formations.

Accurate electrical logging of oil wells is a Lane-Wells Service which enables petroleum engineers to correlate wells and differentiate between oil sand, water sand and impermeable shale. Its development has increased many times man's knowledge of the world in which we live. Complete information of Lane-Wells Technical Oil Field Services is available through any Lane-Wells branch, or by mail.

LANE-WELLS COMPANY
Los Angeles - New York - Houston
Branches in all principal oil fields

LANE WELLS
COMPANY
TECHNICAL OIL FIELD SERVICES

HOW ABOUT THE HOUSE?

(Continued from page 226)

remarked: "A cellar is always a fine thing for an engineer to worry about keeping dry. Keeps his mind off wondering when the roof will start to leak." And a third: "Am anticommunity (even in own house and garaging").

Surprising also was the fact that of the 80 who knew, 70 per cent reported that their houses had been designed by architects. One hundred out of 107 would employ an architect if building again, and the reason usually given was that the architect could contribute professional competence lacked by the owner, should save money for the owner, and in any event would produce a better job. There was practically no criticism of the architectural profession.

MODERN ARCHITECTURE

However, this attitude does not mean that the architect would be given carte blanche. Three-quarters would not leave the selection of style to the architect. Three-fifths did not agree that style is unimportant. And this question led naturally to a discussion of Modern architecture. What Modern architecture meant to our contributors may perhaps best be expressed by another table:

Flat roof	75	Cheese boxes	45
New materials	71	New type of plan	34
Corner windows	49	Austerity	23

This result was rather surprising, for it is precisely on the plan and on austerity or simplicity of detail that Modern rests its case. Few were willing in any event to let the description of Modern go with a mere filling in of check marks. Those who liked Modern (and they were 44 per cent) were temperate, contenting themselves with philosophical concepts such as "contemporary thinking," "unity, consistency, harmony of form and decoration," "breaking away from old conventional styles that are fundamentally inadequate for the modern method of living."

But if the reasoned remarks of the proponents of Modern seemed to state primarily an intellectual case, the words used by antagonists stated with more vigor the emotional case. Mild was the man who described Modern as "any departure from orthodox . . . designed for looks and not utility." Or the man who said: "To revert to a type of building similar in architecture to that in use 2,000 years ago does not appeal to me as modern." People of the middle ground muttered such things as "practical rather than homey," "regimentation, lack of personality, coldness," "funny, square-cut furniture of wood," "most uninteresting." But the shock troops went over the top with such castigations as "chicken-house architecture," "juvenile architects," "half-baked," "bunk," "surrealism," "architecture gone mad." Forty-four per cent, as we have already said, liked Modern domestic architecture. Twenty-five per cent liked it well enough to want it for themselves. Let not the traditionalists plume themselves on this ballot. For proper judgment it should be contrasted with the results of a similar ballot if taken ten years ago. The conjecture is not hard to make. (Continued on page 230)

Announcing

A Greater Service to Investors

FIVE years ago, Babson's Reports broke all precedents with the announcement of a Supervised Investment Service for \$120 a year. In taking that forward step, we accepted a fact well known to every seasoned investor: It is utterly impossible for anybody to supervise successfully *all* securities. That was why we focused our efforts on certain issues which offered the real opportunities.

Supervision Pays

The practical results of such concentration have been impressive. The recent market advance is a typical test period. The Babson Selections have leaped 40% in market value while the Dow-Jones Industrial Average has advanced only 32%; this means Babson clients' profits have been 25% greater than the market average.

Based on five years of successful experience, we are now supervising a somewhat larger list of securities. They include the market's real income-producers and profit-makers. This enlarged supervision means an even more comprehensive service to you as an investor.

Conserve Your Principal

To increase and protect your income and profits is the purpose of Babson's Reports. In the thirty-four years this organization has been serving investors, improvements have been continuous. Clients have benefited steadily.

Write for Special Circular

Today's enlarged Supervised Service constitutes still another forward stride. Let us show you how it fits your personal needs and how it can relieve you of investment worries and burdens.

Babson's Reports, Incorporated, Div. 73-144, Babson Park, Mass.

Without charge or obligation send full particulars of your Supervised Investment Service and copies of your current reports on the business and market outlook.

NAME _____

ADDRESS _____

Babson's Reports

**MANHATTAN
RUBBER
PRODUCTS**
for
INDUSTRY

Transmission Belt
Conveyor Belt
Hose for every service
Molded Goods
Rubber Linings and
Coverings
Brake Linings and
Clutch Facings
Abrasive Wheels

Col. Arthur F. Townsend, '84
Thomas H. Boyd, '23
Wilder E. Perkins, '25
Charles P. McHugh, '26
Daniel J. Hanlon, '37

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES AND FACTORIES, PASSAIC, NEW JERSEY


1903 1939

K-A ELECTRICAL WARP STOP FOR LOOMS

SUCCESSFULLY USED ON VARIOUS
JACQUARD WEAVES, UPHOLSTERY
GOODS, TIE SILKS, BROCADES AND
THE LIKE

RHODE ISLAND WARP STOP EQUIPMENT CO.
Pawtucket, R. I. EDWIN C. SMITH '91, President

The Rumford Press
CONCORD, NEW HAMPSHIRE



WHERE PRINTING IS STILL A
Craft

HOW ABOUT THE HOUSE?

(Continued from page 228)

Modern architects have often proclaimed the virtues of anonymity for the architect. In the minds of our group they have attained that virtue. The correspondents were invited to vote for one of six men who, to them, most epitomized Modern architecture. All of these men are distinguished practitioners, all have been publicized widely and not alone in the professional press. Yet nearly half of those who answered had heard of none of these men. Those who had, often voted for more than one or, in one case, for all. The oldest of the group, the man whose recognition comes 25 years too late, was Frank Lloyd Wright. He received the only substantial vote — 55 — followed in succession by Gropius with 12, Stone ('27), Neutra, and Wurster with four, three, and two, respectively. Le Corbusier received one ballot, and votes were written in for Forsyth, Mies van der Rohe, Dudok, Saarinen, Lescaze, and Metro-Goldwyn-Mayer. The discussion was closed by a man who wrote of the Modern architects that they "probably all get a New England farmhouse for a summer home and that, if so, is interesting."

In general our correspondents did not think a Modern house was so good an investment as a traditional house because of its lack of resale value. Others thought Modern houses were too faddish or cost too much or were like a piece of swing music and about as lasting in value. But another summarized the entire argument when he wrote with some acerbity: "Neither are good investments."

It is a cliché among housing experts that the house costs too much as compared with other things. Specifically with respect to their own houses, two-thirds of our correspondents did not think so. But in spite of this, possibly because of some unusual acumen in the purchase of the personal house, four-fifths thought the industry of providing houses was on the whole archaic. All the things usually blamed by the experts were invoked. There were no new ideas except perhaps this sage observation: "Considering our individual refusal to live in anything just like the other fellow has, which prevents mass production, I think the industry does pretty well."

OTHER CONSIDERATIONS

Next we asked what any man had paid for in his house which he didn't want. Practically every Technology man got exactly what he wanted — no more, no less. One complained of a needless recreation room, one of a breakfast room, one of an attic which he couldn't enter. But, so far as invoking fireworks goes, the question was a failure.

So, too, it must be confessed, were our requests for suggestions of improvement in the present house. The most novel or useful of these (and there were remarkably few good or original ones) may be quickly surveyed.

Planning. Make a thorough study of the flow of traffic by homes. We badly need houses which are cooler in summer. We ought to have houses which can be hosed down, inside and out, for major cleaning operations.

Porches and entrances. A cheap equivalent of a portecochere combined with garage (essentially the car port of Modern architecture) is urged on the ground that "the entrance used by the family is the back door. Locate the garage so the front door can be used but do not expose garage to public view at front of house." Porches are too often placed with regard to the street development or for architectural effect instead of for utility and privacy; the purpose of the porch is to aid in changing from outdoor to indoor preparations and comfort, and it should be treated accordingly.

Heating and ventilating. A substantial number were opposed to current heating systems. Some reaction against humidification and some interest in radiant heating were expressed. A great many spoke for more uniform temperature control. Others wanted more flexibility, "more easily controlled variable temperatures where different members of the household hang out to suit preference of the moment." Another went farther in demanding portable heat units. There was a perceptible reaction against ducts which are "conductors of conversations from one room to another or air ducts for the maid's incense." About fuels there was no uniformity of opinion, but one man asked for reduction of parts requiring cleaning or ash removal, and from the Pacific Coast came the suggestion that something must be done to eliminate summer dampness which there destroys more heating equipment than all the winter fires. Several suggested low unattended heating, or simple stand-by heating plants in addition to the modern automatic heater, while one man said he would "have at least two separate systems, using one in coldest weather only." Curiously, no one mentioned the possibilities already demonstrated in solar radiation of properly oriented rooms.

Plumbing and sanitary equipment. The great chorus went up against the unnecessary noise of the noiseless plumbing fixture. Leaking washers, sticking valves, and bathroom leaks were a source of considerable annoyance. Forcibly expressed was the need for better facilities for cleaning pipes. One lady suggested putting the kitchen sink in the middle of the floor; suggested also having an outside door to a clothes yard, with hanging rods on the ceiling on which to run out the clothes to be dried.

Lighting. Though the technique of domestic lighting was broadly criticized, the chief defect seemed to be an insufficiency of base plugs. Several wanted light more nearly like daylight; a number suggested indirect lighting, usually of the ceiling by (Concluded on page 232)

MONSANTO CHEMICAL COMPANY

Merrimac Division

EVERETT
MASSACHUSETTS

*The largest and oldest
chemical manufacturer in New England*

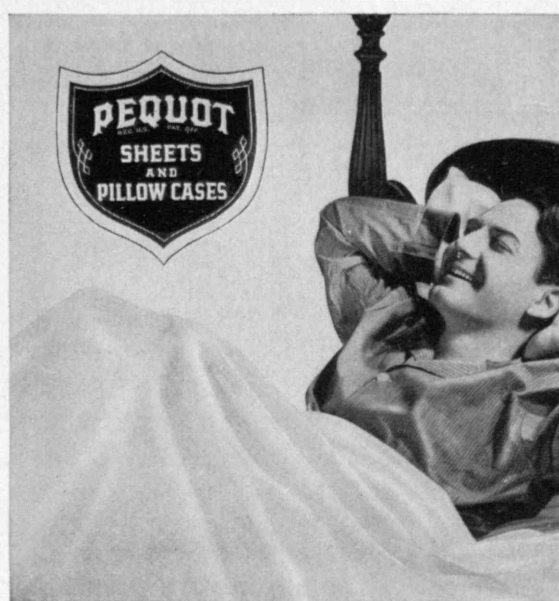
Simplex-ANHYDREX:-

A new insulation for wires and cables made from deproteinized rubber. It has low water absorption characteristics and is ideal for underground or submarine power or signal cables.

Detailed information on request.

SIMPLEX WIRE & CABLE CO

79 Sidney St., Cambridge, Mass.



PEQUOT MILLS

SALEM, MASS.

HENRY P. BENSON
President

—Class '86

HOW ABOUT THE HOUSE?

(Concluded from page 231)

means of cornice or cove; one suggested no lamps at all but pull-out blocks of light which would be decorative in the daytime as well as in the evening. Silent switches were desired. All those who mentioned fixtures at all thought they were exceptionally and unnecessarily ugly, and there was a reasonably general impression that though lighting engineers could do a lot better, for some reason they were not doing so.

Building materials. Generally a complete bill of health was given these. Those most under fire were outside paint, stucco, plaster, and trim. The quality of workmanship was often deplored. Nonfading colors for shingles were wanted by some, but others said shingles and wallpaper were out of date. People did apparently have difficulty in waterproofing cellars and in keeping linoleum stuck down. Surprisingly few plopped for plastics as the cure-all of the building industry.

These sparse suggestions were in sharp contrast to the vitality of those made about the automobile by a similar group not so long ago (see *The Review*, December, 1937). There may be a deep-seated reason for this, as expressed by the gentlemen who wrote: "Planning, to be economic, connotes standardization. In my home I have my last stand as an individual, to be inefficient if I please. I make my living by being efficient."

No better were the rabbits pulled out of the hat of the question of pet peeve. Though engineers are notoriously critical, they were all sweetness and light when it came to finding anything wrong with their houses. Noisy plumbing, dirt, and high cost enraged them most. But obviously home was generally sweet home. Only five agreed on a single peeve: rising taxes. With which postscript to the powers that be we may well conclude.

FROM THE DEEPEST DIVE

(Continued from page 209)

of his idea was well demonstrated in the miracles which it performed for our little guinea-pig divers. Would it work on human beings?

At the Milwaukee County Hospital was a huge chamber which had been built by Chief Engineer Joseph Fischer for the treatment of compressed-air workers who had the bends. The only known remedy for this dreaded disease is to go back again under pressure and redissolve the nitrogen bubbles in the system, which, according to present theories, fizz in the body during too rapid decompression. Dr. End and I built an apparatus that allowed us to breathe only our own mixture of helium and oxygen in this pressure chamber as Mr. Fischer turned the compressed air into the tank.

Johnny Craig came to town. The two of us started breathing a mixture of two-thirds compressed air and one-third helium at a pressure equal to 100 feet of water. Every day the helium percentage was increased and the nitrogen decreased, these calculations being made from our own theories from the studies of this gas and from the experimental results on the guinea pigs. On the last day of this series we came out of 100 feet of water pressure (with a specified minimum decompression time of 47 minutes) in exactly two minutes — approximately 1/24th of the compressed-air decompression time! We had no bends, and under that pressure our minds were as clear as crystal. The intoxicating, groggy, narcotic effects well known to all divers obviously were due to the high-pressure nitrogen. From now on we would breathe nitrogen air at atmospheric pressure, but helium air undersea.

The experiments continued in open sea, the new artificial air being supplied from the cylinders carried on the back. The dives were going to (Concluded on page 233)

PREPARATORY SCHOOLS FOR BOYS

BERKELEY PREPARATORY SCHOOL

Established 1907

Special preparatory courses for M.I.T.

Day School — Evening School — Summer Session — Co-Educational

Accredited by N.E. College Entrance Certificate Board

HARRY F. CADE, JR., '28, Headmaster

470 Commonwealth Ave., Boston Send for Catalog "T" Tel. COM 9262

CHAUNCY HALL SCHOOL

Founded 1828. The School that confines itself exclusively to the preparation of students for the Massachusetts Institute of Technology.

FRANKLIN T. KURT, Principal

553 Boylston Street, Boston, Mass.

CRANBROOK SCHOOL

Distinctive endowed preparatory school for boys. Also junior department. Exceptionally beautiful, complete, modern. Unusual opportunities in music, arts, crafts, sciences. Hobbies encouraged. All sports. Single rooms. Strong faculty. Individual attention. Graduates in over 50 colleges. Near Detroit.

REGISTRAR

4320 Lone Pine Road, Bloomfield Hills, Michigan

HEBRON ACADEMY

Thorough college preparation for boys at cost surprisingly low due to endowment and country location. 79 Hebron boys, freshmen in college this year. Experienced faculty. Excellent dormitory, classroom, laboratory and athletic equipment. Write for booklet and circulars.

RALPH L. HUNT, Principal, Box T, Hebron, Maine

HUNTINGTON SCHOOL FOR BOYS

Five Forms. Special two-year course for entrance to M.I.T.

Summer Session (Co-educational)

Send for catalogues

CHARLES H. SAMPSON, Ed.M., Headmaster

320 Huntington Ave., Boston

Tel. Kenmore 1800

NEW HAMPTON SCHOOL

A New Hampshire School for Boys. 118th Year. Emphasis on Thorough Preparation for Technical and Liberal Arts Colleges. School's Location and the General Participation in Sports, Conducive to Health. Six Modern Buildings. Address

FREDERICK SMITH, A.M., Box 191, New Hampton, N. H.

FROM THE DEEPEST DIVE

(Concluded from page 232)

depths which never could have been undertaken if the diver had to breathe ordinary air. Decompression was being cut to a fraction of its normal time. On the bottom, our minds seemed to be clear as ever.

The greatest depth to which any man had ever descended was 306 feet, a record made by United States Navy diver Frank Crilley in 1915 when he attempted to reach the sunken submarine *F-4* in the warm waters off Honolulu. Crilley was brought up from this depth unconscious.

Just a few minutes before this tale begins I had been 114 feet deeper than Crilley's dive. Apparently helium was the answer. Idling there, relaxed and contemplative, with the hull bulking above me and the quicksilver sky of the water world undulating in strange beauty, I thrilled to the challenge of the world that this new gas would open up. I remembered that there was a twenty million dollar cargo in the flooded strong rooms of the torpedoed liner *Lusitania*, lying in 320 feet of water 12 miles off the coast of Ireland. . . .

THAT same voice interrupted my thoughts. "Haul away."

"Haul away," came the confirmation. A minute later the large cylindrical window of the diving helmet broke the surface, and I found myself in a world of air. The water immediately started to freeze on the suit. The brilliant light hurt my eyes. Somebody had a hot drink ready for me. Everybody seemed to be half frozen to death.

I had left behind a different world, but one of adventure, mystery, beauty, challenge. And helium seemed to be the means for the next stage of man's conquest of this latest frontier.

PANDORA'S ICEBOX

(Continued from page 215)

is turned off. Consequently when one of these salts is magnetized, then cooled by evaporating helium, and then demagnetized, it will become still colder. Only a small amount of heat is withdrawn by this process, but since the heat capacities of bodies are so small at these temperatures, a considerable amount (Concluded on page 234)



MORNING FACE IN THE BERKSHIRES

A small boarding school for boys and girls from four to fourteen. Prepares for leading secondary schools. Men and women teachers who understand children. Intimate home life.

for information address

MRS. ELEANOR RUNKLE CRANE, *Director*
Richmond, Mass.

Boit, Dalton & Church INSURANCE

89 BROAD STREET
BOSTON, MASS.

85 JOHN STREET
NEW YORK, N. Y.

SPAULDING-MOSS COMPANY

**PLANOGRAPH
PHOTOSTAT BLUEPRINT**

Sets the Standard for New England

42 Franklin St.
263 Park Sq. Bldg. — 113 Purchase St.

**LIBerty
3000**

Stahleker Steel Corp.

Second and Binney Sts., Kendall Sq., Cambridge, Mass.
Telephone Trowbridge 1440

Hot Rolled Bands, Round, Square and Flat Bars,
Channels, Tees, Plain and Diamond Pattern Plates
Structural Angles, Beams.

Cold Rolled Bars—Norway Iron—Deformed Bars for Concrete
LARGE STOCK PROMPT SHIPMENT
WALLACE BLANCHARD, '16, Treasurer

William H. Coburn, '11 William F. Dean, '17

William H. Coburn & Co.

INVESTMENT COUNSEL

68 Devonshire St. Boston, Mass.

**SPECIAL
MACHINES**

Manufactured to Order
Under Conditions Assuring
High Standards of Precision

**FIDELITY
MACHINE COMPANY**

3908-18 Frankford Ave., Philadelphia, Pa.

**BRAIDING, KNITTING,
SPOOLING, WINDING
AND GARMENT PROCESSING
MACHINES**

PANDORA'S ICEBOX

(Concluded from page 233)

of cooling results. By this technique, a temperature only 0.008 degrees above absolute zero has been reached — truly a "farthest south" in temperature exploration. The technique has only recently been perfected, and only a small portion of the new field thus opened has been investigated. No one knows what queer phenomena will be discovered in these farther reaches of fridity.

Most of the discoveries mentioned in this article have been made at Leyden with the apparatus built by Kamerlingh Onnes. These results and the many others discovered by his colleagues constitute an almost perfect tribute to a man who had the hardihood to tackle a job which was too difficult for the rest of his contemporaries. In the past ten years, now that the importance of such research has been demonstrated, low-temperature equipment has been set up in a number of other places in the world. The installation at Technology is being designed for flexibility and safety; and the use of low temperatures in conjunction with the tremendous magnetic fields available in Professor Francis Bitter's laboratory, together with the equipment available in the spectroscopy laboratory, should make possible much important and useful research.

It may be wondered why research at these farthest extremes of cold should have enough practical uses to justify the considerable expense and effort required. Only a little investigation, however, is needed to show the eventual practical importance of such work. Many commercial chemical processes can be made more efficient when the chemical and thermal behavior of gases at low temperatures is more thoroughly known. This, of course, is the original reason why Kamerlingh Onnes set up his equipment. Nevertheless much of the field still awaits study. The understanding of the true nature of liquids, of evaporation and of solidification, can probably be clarified by further studies of that most perfect fluid, helium II. The nature of metals and of alloys, of electrical conduction, and of heat flow cannot fully be understood till we understand superconductivity.

The

HANDBOOK OF COLORIMETRY

Prepared by the STAFF OF THE COLOR MEASUREMENT LABORATORY, Massachusetts Institute of Technology, Under the Direction of ARTHUR C. HARDY.

PRICE \$5.00

THE TECHNOLOGY PRESS
Massachusetts Institute of Technology Cambridge, Massachusetts



Transits and Levels are used on all largest works and by U. S. Govt. for utmost precision. Rental lists.

New catalog, just issued, sent gratis

BUFF & BUFF CO. Boston 30, Mass.
L. F. Buff '97 — Henry A. Buff '05
A souvenir plumb-bob sent for 5c postage

PROFESSIONAL CARDS

JACKSON & MORELAND

Engineers

Public Utilities — Industrials
Railroad Electrification
Design and Supervision — Valuations
Economic and Operating Reports

BOSTON

NEW YORK

FAY, SPOFFORD & THORNDIKE

ENGINEERS

BOSTON, MASS.

BRIDGES

WATER SUPPLY AND SEWERAGE

PORT AND TERMINAL WORKS

FIRE PREVENTION

INVESTIGATIONS

DESIGNS

SUPERVISION OF CONSTRUCTION

H. K. BARROWS, '95

M. Am. Soc. C. E.

CONSULTING HYDRAULIC ENGINEER

*Hydro-electric developments — Water supplies. Reports, plans,
supervision. Advice, appraisals.*

6 BEACON STREET

BOSTON, Mass.

STANLEY G. H. FITCH '00

CERTIFIED PUBLIC ACCOUNTANT

of PATTERSON, TERRE & DENNIS
1 Federal Street, Boston, Mass.

Cost Accountants and Auditors — Tax Consultants

NEW YORK

BOSTON

WASHINGTON

REPRESENTATIVES IN OTHER PRINCIPAL CITIES OF THE
UNITED STATES, CANADA, ENGLAND AND AUSTRALIA

EADIE, FREUND AND CAMPBELL

CONSULTING ENGINEERS

110 WEST FORTIETH STREET

NEW YORK CITY

Plans and Specifications — Examinations and Reports

Power, Heating, Ventilating, Electric, Plumbing,
Sprinkler, Refrigerating, Elevator Installations, etc.,
in Buildings and Industrial Plants

J. K. CAMPBELL, M. I. T. '11

MAURICE A. REIDY

Consulting Engineer

BRIDGES

BUILDINGS

STRUCTURAL DESIGNS

FOUNDATIONS

CONSTRUCTION CONSULTANT AND ARCHITECTURAL ENGINEER

Estimates and Appraisals

44 SCHOOL STREET

BOSTON, MASS.

GILBERT NELSON REED

Attorney and Counsellor at Law

SUnset 6-7930

527 Fifty-Eighth Street
Brooklyn, N. Y.

EVERETT E. KENT

PATENT LAWYER

Patents, Trade Marks, Copyrights

United States and Foreign

75 Federal Street, Boston

HUBbard 0234

BENNETT H. LEVENSON '22

PATENT LAWYER

Formerly Examiner in United States Patent Office

PATENTS, DESIGNS, TRADEMARKS, COPYRIGHTS

CHEMICAL MATTERS A SPECIALTY

Washington Loan & Trust Bldg., Suite 1004, Washington, D. C.

GEORGE T. SOUTHGATE '10

Electrical and Thermal Engineer

Consultant in

APPARATUS, PROCESS and PATENT MATTERS

Office and Laboratory

114 East Thirty-second Street
New York, N. Y.

Telephone

LExington 2-8130

AN AID TO INDUSTRY IN LOCATING OUTSTANDING MEN

MAIL ORDERS

Technology has been extremely successful in placing men through correspondence. About 40% of each graduating class are placed by mail.

*If you cannot pick your men in person,
please write*

PLACEMENT BUREAU

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CAMBRIDGE, MASS.

AN AID TO ALUMNI IN FINDING DESIRABLE POSITIONS

TECHNOLOGY MEN IN ACTION

CHECK LIST OF THE ACTIVITIES AND ACHIEVEMENTS OF M.I.T. ALUMNI, OFFICERS, AND STUDENTS

Pretty Special!

¶ CHARLES E. LOCKE '96, elected an honorary member of the Mining Institute of Japan.

¶ VANNEVAR BUSH '16, received from Research Corporation an award of \$2,500 in recognition of distinguished scientific achievement. Dr. Compton presented the award on behalf of the Research Corporation at a banquet in New York City on February 2.

¶ JOHN CHIPMAN, Staff, won the Robert W. Hunt Award for 1939 from the American Institute of Mining and Metallurgical Engineers for his paper, entitled, "Evolution of Gases from Rimming-Steel Ingots," written with Kenneth C. McCutcheon.

Yale-Life Conference on House Building Technics

¶ The sponsors of this conference — Yale University, School of the Fine Arts, Department of Architecture, and *Life Magazine* — achieved a really brilliant gathering (January 31 and February 1) at which were represented by their outstanding exponents the architects, directors of laboratories of materials manufacturers, prefabricators, government financial agencies, and the universities. Of the dozen major speeches presented, three were by Tech men: C.-E. A. WINSLOW '98, Professor of Public Health, Yale University, "Heating and Ventilation of the House"; RALPH T. WALKER '11, President, Architectural League of New York, "Contemporary Design: New Directions"; and JOHN E. BURCHARD '23, Director, Bemis Foundation, "Research Programs for Shelter." A. B. KINZEL '21, chief metallurgist, Union Carbide and Carbon Research Laboratories, presided over the round-table conference on metals and alloys. We have no way of knowing how many Tech men in all were present, but among those additional to the foregoing were A. LAWRENCE KOCHER '13, *Architectural Record*; KENNETH REID '18, *Pencil Points*; ROYAL BARRY WILLS '18, architect; PIERRE BLOUKE '19, Home Owners' Loan Corporation; MALCOLM B. BEATTIE '23, E. Pulver Cook Company, Inc.; VINCENT K. CATES '24; HERBERT L. BECKWITH '26, Assistant Professor of Architecture at Technology.

Written

¶ By RALPH G. HUDSON '07, "Engineers' Manual," second edition, John Wiley.

¶ By DELOS G. HAYNES '09, an article, "Needs of Our Patent System," *Industrial and Engineering Chemistry*, December. This was presented first as an address before the American Chemical Society and has been reprinted in the *Journal of the Patent Office Society*, January.

¶ By CLARK S. ROBINSON '09 and EDWIN R. GILLILAND '33, "The Elements of Fractional Distillation," third edition, McGraw-Hill. This edition contains much new material, including chapters on the rectification of binary mixtures, multicomponent rectification, and column performance. There are also new data on vapor-liquid equilibrium.

¶ By ELISABETH COIT '19, an article, "\$25 a Month for Your Own Home," *Woman's Day*, February. This article is illustrated with views and plans for six houses, and Miss Coit discusses points to keep in mind when building and methods of financing a small home. Miss Coit was awarded this fall for the second time an Edward Langley Scholarship from the American Institute of Architects, first granted to her in 1937 to conduct research in economical design and construction of single-family dwellings and apartment houses.

From the Platform

¶ By LYMAN F. WHITNEY '09, "The Stator Unit," a lecture before the American Society of Refrigerating Engineers, Boston section, January 26. This meeting was presided over by CARL L. SVENSON '19, Associate Professor of Heat Engineering at the Institute.

¶ By JOHN G. KIRKWOOD '29, a lecture on order and disorder in nature as shown in solutions, delivered at the symposium on intermolecular action at a meeting of the American Chemical Society. FREDERICK G. KEYES, Staff, delivered a scientific address also at this meeting which took place in Providence, R.I.

¶ By HERMON H. SCOTT '30, "Equipment for the Measurement and Analysis of Sound," a lecture before the Air Conditioning Bureau in Boston, December 14.

In the News

¶ EDWIN W. JAMES '07, as chief of the division of highway transport, United States Bureau of Public Roads, on becoming a member of a delegation to Santiago, Chile, for the Third Pan American Highway Congress.

¶ ALEXANDER ELLIS '08, on becoming chairman of the insurance group, industry and finance division, Greater Boston's 1939 Community Fund Campaign.

¶ ROYAL BARRY WILLS '18, on winning honorable mention in the *House Beautiful's* 11th annual small-house competition.

¶ ERIC KEBBON '12, on designing new high school for Queens, adjoining the World's Fair grounds.

DEATHS

* Mentioned in class notes.

¶ CLIFFORD R. WELD '75, January 17.
¶ EDWARD H. DEWSON '85, February 9.

¶ CHARLES W. DAWSON '89, July 5.

¶ ALBERT SAUVEUR '89, January 26.

¶ PRESCOTT H. COOLIDGE '94, January 14.*

¶ CHARLES H. DEITERING '94, July 3.

¶ R. WALDO GILKEY '94, December 27.

¶ RICHARD G. B. SHERIDAN '95, January 22.*

¶ JOHN S. WHITAKER '96, March 21, 1938.*

¶ ELLEN LYSAGHT '97, July 30.

¶ EDWARD STURTEVANT '98, January 17 (see 1897 notes).

¶ ALICE M. GRAY '99, January 17.

¶ JAMES D. MACBRIDE '99, June 22.

¶ DEAN HINMAN '00, January 18.

¶ CHARLES F. W. WETTERER '06, January 24.

¶ CHARLES L. BATCHELDER '08, January 18.

¶ CHARLES M. OSBORN, 3d, '16, December 30.*

¶ FREDERICK L. GAMAGE, JR., '17, January 11.

¶ CHARLES E. POIRIER '18, April 21.

¶ LLOYD LOGAN '24, December 29.

¶ ROBERT HERRICK, Former Staff, December 23. Mr. Herrick was an instructor in the Department of English and History from 1890 to 1893. For the last three years he had been government secretary of the Virgin Islands, where he died of heart disease at the age of 70.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

M.I.T. Association of Cleveland

Twenty-four Technology students whose residences are in Cleveland and vicinity were guests of the Association at a luncheon meeting held Saturday, December 31, at the Cleveland Club. The undergraduates were welcomed by Tyler W. Carlisle '10, President of the Association, and the speakers were Morris Nicholson '39, whose topic was "A Senior Looks Back"; Alva Herman '39, who told us about the Musical Clubs, especially the Glee Club; and Lawrence Turnock, Jr., '41, who discussed undergraduate activities in general, with particular emphasis on athletics. These young men had their topics well in hand, spoke excellently, and gave us a picture of Technology from a viewpoint quite different from that of the itinerant staff members who visit us all too infrequently.

After the speaking was concluded most of the Alumni present took advantage of the opportunity to talk individually with the undergraduates and to inquire searchingly into the state of the Institute. This joint meeting of Alumni and undergraduates was very successful—so successful that we now plan to make it an annual event of the Christmas holidays. — WM. CRIGHTON SESSIONS '26, *Secretary*, Richey and Watts, Union Commerce Building, Cleveland, Ohio.

Technology Club of Southern California

A dinner meeting of the Club was held at the University Club, Los Angeles, January 16. Fifty-three Alumni were present, the largest group to gather here for some time and a fitting tribute to the popularity of our guest of honor, H. E. Lobdell '17, Dean. After a pleasant dinner each Alumnus identified himself, and Classes were represented from 1890 to 1937.

It was interesting to note that whereas the mining engineers were predominant in the older group, the young Alumni in southern California all seemed to be aircraft engineers. After some political steam-rolling by our suave President, Bill Robinson '24, the present administration managed to keep itself in office for the balance of the season. Lobby talked to us about recent developments at Cambridge and then answered innumerable questions very ably until he sank exhausted into his chair at 10:30, whereupon the meeting broke up. — RALPH B. ATKINSON '29, *Secretary*, 6706 Santa Monica Boulevard, Hollywood, Calif.

M.I.T. Club of Northern New Jersey

The executive committee of the Club met on January 13 and discussed plans for activities for the balance of the year. By the time this notice appears, the February Smoker will be a thing of the past.

Plans for the annual banquet have taken on definite shape. President Compton will be an honored guest and speaker, which itself will insure a large attendance. The banquet will be held in the main ballroom of the Newark Athletic Club on April 20 and as usual will be informal and stag.

All Alumni in northern New Jersey are cordially invited, and notices will be sent to all whose addresses in northern New Jersey are known to the Secretary. — CLAYTON D. GROVER '22, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York, N. Y. FREEMAN B. HUDSON '34, *Assistant Secretary*, Colgate-Palmolive-Peet Company, 105 Hudson Street, Jersey City, N. J.

M.I.T. Club of Western Pennsylvania

On December 6 our Club held its usual meeting at the University Club in Pittsburgh. We were very fortunate to have as our guest Horace S. Ford, Treasurer of the Institute, who gave a delightful talk about Technology. After giving us a brief but complete story of the Institute's finances, Mr. Ford proceeded to talk about the M.I.T. of today, supplementing his comments with slides showing the new facilities for both physical development and further study already built or under construction. Many an old-timer sighed deeply after the film had run its length, as if to say: "How I wish I could have gone to M.I.T. in an age such as this."

In discussing changes in the Faculty, Mr. Ford pointed out that there is a trend at M.I.T. to put young, well-qualified men into important positions such as the head of a department so that they may grow up with it.

On December 28, the M.I.T. students whose homes are in and around Pittsburgh were given a welcome-home dinner. Thomas Spooner '09, chairman of the Pittsburgh scholarship committee, commended the Pittsburgh undergraduates on their fine scholastic showing evidenced by the fact that most of them stood high on the Dean's list. Mr. Spooner congratulated Oliver Fulton '40 particularly, as he proved he deserved the scholarship given him last fall. There were present at this luncheon 12 undergraduates and 20 Alumni. — ROBERT A. OLSEN '35, *Secretary*, 5655 Elgin Avenue, Pittsburgh, Pa. STANLEY T. JOHNSON '36,

Review Secretary, Schenley Arms Apartments, Bigelow Boulevard, Pittsburgh, Pa.

Technology Club of Rochester

The Club held its annual Christmas luncheon on Friday, December 30. At that time it is our custom to invite the undergraduates who are home for Christmas vacation. We were gratified to have 17 undergraduates present along with 40 of the regular club members.

We look forward to this event very much as it affords us an opportunity to meet the undergraduates and to know them better. It also gives us a chance to hear firsthand the latest happenings at the Institute. John C. Artz '40 related the high spots of Field Day. Frederick J. Kolb, Jr., '38, told about new building developments. This talk was naturally centered about the new Rogers Building. Wilfred H. Shaw '42, gave his impression of the freshman starting in at Tech. A few disparaging remarks were made about the sophomores, so I have been watching the Infirmary list in the *Tech* for Mr. Shaw's name. John C. Vyverberg, Jr., '39, talked on athletics, and Roger B. Bross '39 on dinghy sailing. We found it difficult to adjourn such an interesting meeting, and we wish to express our appreciation to the undergraduates who made it so.

Our plans for the winter are indefinite, but we hope to have a bowling party in the near future and a dinner meeting as soon as we learn of an available speaker. — RALPH W. PETERS '30, *Secretary*, Building 50, Kodak Park, Rochester, N. Y.

Washington Society of the M.I.T.

The December meeting of the Society was held at the Lafayette Hotel on Friday, December 16, at 5 P.M., with President James '07 in the chair. As usual we had a few words from our Honorary Secretary, Proctor Dougherty '97, who expressed the hope that he would be able to have Dr. Bush '16, the new President of the Carnegie Institution, at our next meeting. He also mentioned recent bequests made to the Institute, totaling about \$1,700,000, and announced that 656 had entered as freshmen, although 1,535 had made application. We now have 2,093 enrolled. In the way of physical changes, he mentioned the completion of the William Barton Rogers Architectural Building, the new Graduate House (remodeled Riverbank Court), and the wind tunnel, named for the Wright brothers.

Newcomers and visitors were Edwin J. Grayson '17, Procurement Division; Baird Snyder, 3d, '24, Farm Security Administration; Paul Martini '28, W.P.A.; Emery L. Lasier '12, Maritime Commission;

Chester K. Allen '17; Warren N. Watson '14; E. Robert De Luccia '27; W. Lee Graves '16; Anthony G. Zahka '29; and F. E. Richardson '16.

In introducing the speaker, President James expressed his admiration for the organization represented. Admiral Land '06, chairman of the United States Maritime Commission, described his job as a headache at one end and walking on eggshells at the other. In reply to a prominent senator's question as to how he was getting along, he remarked: "Not very well. How in hell could you get along with 96 bosses on one side of the capitol and 435 on the other?"

In outlining the Maritime Commission Law, Admiral Land listed the main features as: (1) construction subsidy, (2) operating subsidy, and (3) training for personnel. In connection with the first item the commission pays the difference between American construction costs and those elsewhere. Only enough is provided to assure parity with foreign competition. Similarly, in connection with the operating subsidy, the difference in cost of wages, maintenance, food, insurance, and so on, is determined and provided. Private operators are the first to be given the opportunity to create and maintain an adequate merchant marine; only if they fail must the government effect the result directly.

The legal life of a ship is but 20 years; the World War ships are therefore obsolete. At the time of the recent crisis in Europe, the commission found us not much better off than in 1914. The 114 "old crocks" in the "Reserve Fleet" are not fit to operate in anyone's merchant marine. As a result the commission prescribed a minimum of 500 ships, at 50 per year for 10 years, at a total expenditure of \$1,250,000,000. It now has 47 ships under way and more in view; and next year may effect employment of 36,000 people.

Mr. Kennedy, Land's predecessor, made the country merchant-marine minded, and Land finds an encouraging picture. He feels somewhat as does the United States Marine Corps, whose initials are the same: To be in proper balance, for every dollar expended on the Navy the Maritime Commission should get 20 per cent. In connection with training he remarked that we have never had a proper system like that in every other country, but we are really trying to do the job now. In closing he urged a program of "ship American, travel American, and see the Americas first."

Following this talk, Harry Diamond '22 gave a brief talk on "Some Contributions of Radio to the Upper Atmosphere," describing how miniature balloons carrying radios had now replaced atmosphere expeditions, contributing to greater safety, reduced costs, and better results. Ascending 73,000 feet, they allow study of distribution of ozone, air-mass systems for weather forecasting, cosmic rays, and wind velocities. This has aided air-mass weather forecasting by locating "permanent" high-pressure areas. Harry went into detail on how his

instruments function and how a transmitter was used to indicate and interpret results.

To wind up this excellent program of speakers, Perry R. Taylor '21 of the Group Health Association described briefly the principles, practice, and difficulties of that organization. After these talks we enjoyed an excellent buffet supper. The following members and guests were in attendance: Walter B. Coppinger '11, Chester K. Allen '17, Louis E. Pepperberg '37, Joseph W. Clary '96, Edwin W. James '07, Joseph C. Dort '09, Baird Snyder, 3d, '24, Edwin J. Grayson '17, John W. Hunt '35, Mario V. Caputo '31, C. Phillips Kerr '11, Benjamin A. Howes '97, Raymond S. Poor '31, George W. Stose '93, Kenneth Bernard '22, Frank E. Richardson '16, Oscar S. Cox '27, Philip W. Clark '21, Harry Diamond '22, Albert F. Bird '30, E. Robert De Luccia '27, Oliver G. Green '30, Merton L. Emerson '04, Hewitt Crosby '03, Karl E. Schoenherr '22, Alfred E. Hanson '14, Alfred McDonald '35, John C. Damon '05, Paul J. Culhane '23, Anthony G. Zahka '29, Charles H. Godbold '98, Frederick W. Hunnewell '97, Robert K. Thulman '22, Robert W. West '32, James A. Allan '28, Donald Fife '24, Henry D. Randall, Jr., '31, Neil B. Musser '23, Ernest L. Patch '10, Olcott L. Hooper '23, Alan Osbourne '21, Harry B. Swett '25, W. Lee Graves '16, Patrick J. D. Harney '31, Charles L. Wright, Jr., '34, Theodore L. Soo-Hoo '26, Ben E. Lindsly '05, Paul Weeks '02, George R. Hopkins '22, Paul A. Blair '05, W. Lorrain Cook '03, Henry M. Loomis '97, Frederick W. Turnbull '30, Paul J. Martini '28, Louis J. Grayson '19, Perry R. Taylor '21, Lawrence W. Conant '21, Edward D. Merrill '09, John D. Fitch '24, W. Bion Moore '28, Barron P. DuBois '92, Charles Bittinger '01, Harry G. Hamlet '96, Warren N. Watson '14, Freeman G. Corkum '31, Eugene P. Rowell '22, Mason S. Noyes '19, Emery L. Lasier '12, Proctor L. Dougherty '97, James R. Morton, Jr., '22, Gordon R. Williams '29, Aubrey S. McLeod '21, John Lowe, 3d, '37, Edmund S. Pomykala '23, William K. MacMahon '22, Amasa M. Holcombe '04, Chester H. Hosmer '25, Emory S. Land '06; guests: H. R. Smith and H. A. Dunham.

The January meeting was held as usual at the Lafayette, Friday, January 20, at 5 P.M. Proctor Dougherty '97, now our former Honorary Secretary, sang his swan song as an officer, but we are certain that he will still have a large part in guiding our destinies. Among the new faces he introduced were Stephen G. Henry '24, major in the office of the chief of staff of the Army; C. Leonard Brown '88, the oldest graduate present; Charles W. Fisher '06, captain in the construction corps of the Navy Department; George W. Anderson '20; Gardner Rogers '02; Al F. O'Donnell '18; and Elisha N. Fales '11, who is with the Civil Aeronautics Authority. He also introduced Ernest L. Patch '10, who has attended consistently.

Shortly after installation as Honorary Secretary, Henry D. Randall, Jr., '31, made a few remarks about your Review

Secretary's reportorial prowess, particularly commenting on the length of a recent report in *The Review*. He was promptly taken to task, however, by Edward J. Collins '35, a visitor from Pittsburgh, who said that he had dropped in because of the items he had been reading in the Washington notes. A. E. Hanson '14 was duly installed as executive, otherwise known as corresponding, secretary, taking over Randall's former duties.

Randall asked the members to keep in mind the scholarships to be awarded in the spring, particularly the regional scholarship carrying full tuition for one freshman. Applications, he said, should be coming in shortly, because the committee wants to complete its work well before June. — A slight delay in the arrival of the speaker allowed a little comment upon the coming ladies' night to be held probably in April. Many members indicated their satisfaction with last year's ladies' night, and some expressed approval of a revisit to the National Park Seminary at Forest Glen, Md. We think that the hostesses furnished by the seminary had much to do with its popularity. We were advised of tentative arrangements with two men of national prominence to serve as guest speakers for the annual ladies' night meeting.

Hon. Frank T. Bell, the speaker of the evening, was introduced by our Toastmaster, Vice-President, and Acting President, Ed Merrill '09, who was an excellent pinch hitter for our absent President James '07. Commissioner Bell, in starting his talk, expressed the necessity for giving us some of his background; and while faces dropped momentarily at the thought, they soon turned into broad grins, because Bell, Will Rogers, and Bob Burns must have been molded from more or less the same cast. A humorous, at times semiserious, informative talk followed, delving into anecdotes from the farm in Missouri to salmon fishing in the Northwest and seal raising on the Pribilof Islands. While his talk was of a distinctly humorous vein, he did portray, probably high-lighting it as no other man could, the family life of the seal. In addition, we learned of the propagation habits and what not of every fish regarding which Commissioner Bell's listeners inquired. The talk was followed by much more than the usual volume of questioning and was thoroughly appreciated.

The Society accorded Bell a rising vote of thanks and proceeded with the buffet supper, served by the Lafayette. At about this time Charles Breed '97 put in his appearance and was announced by Dougherty, his classmate. Professor Breed is head of the Department of Civil and Sanitary Engineering at the Institute.

The following M.I.T. men and guests enjoyed this delightful get-together: C. Leonard Brown '88, Harry G. Hamlet '96, Benjamin A. Howes '97, Proctor L. Dougherty '97, Charles B. Breed '97, Lyman F. Hewins '98, W. Malcolm Corse '99, Gardner Rogers '02, Hewitt Crosby '03, Amasa M. Holcombe '04,

Merton L. Emerson '04, Ralph E. Tarbett '05, Ben E. Lindsly '05, John C. Damon '05, Charles W. Fisher '06, Allen Pope '07, Parker Dodge '07, Edward D. Merrill '09, Joseph C. Dort '09, Ernest L. Patch '10, Elisha N. Fales '11, David P. Allen '11, Benjamin F. Thomas, Jr., '13, Henry H. Thompson '13, Alfred E. Hanson '14, Frank E. Richardson '16, Charles C. Gager '17, Chester K. Allen '17, Al F. O'Donnell '18, Mason S. Noyes '19, Merritt P. Smith '19, George W. Anderson '20, Kenneth Bernard '22, Robert K. Thulman '22, William K. MacMahon '22, Rudolf H. Blatter '22, Edward S. Pomykala '23, Paul J. Culhane '23, William D. Rowe '24, G. Donald Fife '24, Henry C. Hoar '25, Joseph Y. Houghton '26, Karl French '26, George D. Mock '28, Gordon R. Williams '29, Amerst E. Huson '30, Oliver G. Green '30, Albert F. Bird '30, Charles L. Wright, Jr., '34, Benjamin S. Malin '34, Michael Cosentino '34, Edward J. Collins '35, Commissioner Frank T. Bell, guest speaker, Judge Orville Smith of Cleveland and E. O. Fitzpatrick of Seattle, guests. — ALFRED E. HANSON '14, *Secretary*, 3424 Quebec Street, Northwest, Washington, D. C. WILLIAM K. MACMAHON '22, *Review Secretary*, 818 25th Street, South, Arlington, Va.

CLASS NOTES

1887

Arthur Nickels writes that he has been enjoying to the fullest the salubrious climate of Sarasota, Fla., since early in December and will be there until the last of April. His address is 124 West 9th Street, where he will be pleased to meet any of the fellows who may be running around loose in that locality. — Solomon Sturges was so delighted with Californian life during his sojourn in Santa Monica and other resorts in that state during his western motor trip last summer that he has purchased a home at 363 20th Street in that city and occupied the same on March 1. He anticipates a much more quiet and enjoyable environment there than is possible in the busy city of Chicago. Evidently Horace Greeley's advice is still worthy of consideration, even by the denizens of the Middle West.

The Secretary was pleased to receive a communication from George Armington recently, a classmate whom we have missed from our gatherings for many years. Armington writes: "While I have been unable to attend the class meetings I do much appreciate the various communications received from time to time, especially the last copy of *The Review*, which I receive regularly. My kindest regards to yourself and other classmates you may contact." Like many another favored son, Armington is basking in the sunshine of Florida, his habitat being Englewood.

Dick Schmidt sends his regards to the Secretary and to any others whom he may meet. He and Lonsdale Green are looking forward to the local Technology alumni banquet on March 2, at which the

latter is the senior member of the committee. As he and Dick constitute the first "class group" (there being not more than one member from any Class prior to '87), Lonsdale avers that "that will be something."

A very interesting letter was received a few days ago from George Sever, written at his Kingston, Mass., home, in the land formerly the hunting ground of Massasoit and his brethren. George says: "I am certainly sorry about George Draper. His life was full of interesting episodes. I am living the quiet life of a winter-bound man in the country, spending part of each day in preparing the simple sustaining meals and wearing the beaten path between the woodshed and the various wood boxes near the kitchen stove and the one upstairs in my sitting room. Shoveling snow has not been irksome, for there has not been much. Spring is on the way and the garden will be calling. My seed requirements have been duly listed and will go to Burpee, the seed house, in ample time. And then life will become busy and out-of-doors."

Frank Brett, another country gentleman of the same historic locality, sent his regards recently and reports that he is in his usual excellent health. Frank is one of the youngest and heartiest looking men in the Class and enjoys life on his country estate in Duxbury. He says he never has any desire to go to the big city and has a deep sympathy for the poor unfortunates who are doomed to spend their lives in the crowded environment.

Latest changes in address include Arthur R. Nickels, 124 West 9th Street, Sarasota, Fla.; John W. Stearns, 819 East Broadway, Logansport, Ind.; George A. Armington, Englewood, Fla.; Solomon Sturges, 363 20th Street, Santa Monica, Calif. — NATHANIEL T. VERY, *Secretary*, 15 Dearborn Street, Salem, Mass.

1888

Everitt Kilburn Taylor, "candid camera man," sent your Secretary, for the class archives, a large number of enlargements of snapshots taken at Marblehead in June, which will be shown at the next get-together, also a large photograph of the M.I.T. Architectural Society taken in 1887 showing 25 students and five members of the Faculty. The students were mostly '88 men including Parker, Hodgkins, Proctor, Kimball, Perkins, Aldrich, Taylor, Moore, Farwell, Carleton, Meade, Bigelow, Bates, and Fuller. He also sent a small etching of St. Marks, Venice, which he made on a Sunday morning in 1929 when the flags were all flying. A remarkably fine piece of work.

Since our last notes mentioning the passing of Norman P. Work we have received a letter from Miss Ruth L. Work, one of his daughters, with additional information in regard to his initiative in founding Hillyer Institute in Hartford, Conn. She says that Hon. Carroll D. Wright in his 17th annual report on industrial education as commissioner of labor, devotes some five pages to an account of Hillyer Institute and warmly praised Mr. Work, its original director.

Have recently received a six-page, 6,000-word letter from Fred Nichols written on six different machines and "ditto" multigrapher while on his way from Chicago to St. Cloud, Fla., and mailed to 140 of his friends. It covers his travels from March, 1938, up to January, but the larger portion of it is devoted to a minute and detailed description of our 50th reunion at Marblehead. Fred didn't miss a thing during the five-day celebration concluding with a chat with President Compton on the final day. Fred's days have been full of travel and excitement ever since his retirement five years ago.

Albert J. Perkins of Santa Ana, Calif., with us during our freshman year, writes: "In 1884 Joe Newell and I met as total strangers in Boston and decided to lodge together and be chums. That acquaintance ripened into a lifelong friendship of 50 years. I inclose an editorial from the *Portland Oregonian* of December 7. As you know this is one of the outstanding newspapers of the Northwest and for them to say the editorial words they did is a merited distinction." The editorial follows: "The reputation for integrity and service lives after him who is so fortunate as to merit this. Not even the finality of death in certain prospect avails to dissuade many of us from cherishing the wish. This is the goal of the unspoken ambition. And those who knew him long, and had occasion to appraise the merit of his life in this community, are speaking well of Joseph Pettus Newell today. He was a civil engineer by calling, and one so competent that report of him, and the demand for his abilities, spread far from Oregon. A man distinguished in his chosen work. Now this is enviable, but more enviable still it is to remember that the structure of his life was sound as any created concept of the engineers — bridging the here and the hereafter memorably. The city and the state have taken their farewells of a citizen whose name was linked inseparably to citizenship in its truest sense. If there is regret in this, the fact of death, there is pride also in the fact of life. For he was a son of Oregon."

Your Secretary was called to Norfolk, Va., suddenly on January 13 by the illness of his son-in-law, a lieutenant on the battleship U. S. S. *Arkansas*. He has enjoyed meeting his shipmates of the Spanish American War, as well as playing considerable golf in this mild climate and also the renewing of his acquaintance with George Roper and his charming wife. All letters sent to the Secretary's Cambridge address will reach him promptly. — BERTRAND R. T. COLLINS, *Secretary*, 16 Chauncy Street, Cambridge, Mass.

1889

Parker Fiske says he is now "out of the sick class," can walk a mile and "isn't worth a notice." — Hollis French also says he is practicing to get along without canes, though he thinks he will have to drop tennis. He goes to his office several days weekly and keeps in touch with his

1889 Continued

practice by telephone and otherwise. When at home he is very busy on a book about some early American silversmiths which he hopes to finish this year. He has plans in mind for our 50th reunion in May or June, and something will be released before very long.

Lewis E. Johnson's address is now care of the Atlantic Tile Company, South Olive Avenue, West Palm Beach, Fla. — Clayton Pike died on December 30, and we refer classmates to the obituary from the New York Times of January 1, quoted on page II of the Technology Men in Action section in last month's Review. — WALTER H. KILHAM, *Secretary*, 126 Newbury Street, Boston, Mass.

1891

We have relatively little to report for this issue, but our batting average is still quite satisfactory and those mathematically inclined can figure our space percentage for the year 1938. — Fred Blanchard has been seriously ill but is on the road to recovery and when you receive this we hope he will be out again and on the job. At this writing [January] he is at Brooks Hospital on Corey Hill, Brookline. Several of us have been to see him. — George Holmes has been ill for some time, confined to his home in Newton Center.

Barney is having a comfortable winter, gets out quite regularly to church on Sundays, and while he has fewer visitors this time of year, they still drop in to see him. Mrs. Clarence Whitney of Hartford called recently, as did Hartley White, which pleased him very much.

Ernest Hersam's wife died on November 27 at Berkeley, Calif., after a short illness. Ernest retired last year, and they were looking forward to a well-earned rest. Charlie Garrison wrote on December 9: "Ernest wrote me that she had been declining slowly but was not prepared for the end. The last few days she was at the University of California Hospital in San Francisco under the best care and her death was without great mental or physical suffering. He will live in his present home and I hope he will find some friend to join him, as I don't like to think of him alone on the top of the hill."

"My daughter Margaret has secured a new position just in the line she wished, a psychiatric social worker in the new Family Service Agency being started in Oakland to supersede the old Associated Charities. It opens as a consultation or service agency with cases largely drawn from children referred by the schools. She will spend a couple of weeks with us here this month, and a little later we will help move her from her apartment in San Francisco to one in Berkeley. She was very fond of the Hersams and will see Ernest from time to time. On our visits to her we shall also see him, which we could not do when we had only a day or two in San Francisco."

"Tomorrow we go to San Marino to spend the week-end with the family. We hope to take more trips to the National Parks in the coming year. This year we

saw Death Valley, Boulder Dam, Grand Canyon, Mount Rainier Park, Crater Lake. We keep up our average of 1,000 miles a month. . . . We still enjoy our Music Club each week and are building up a good library of records."

In another letter shortly before, Charlie wrote: "We enjoyed our trip to Palm Springs with Bob, Catherine, and Robbie. It was cold for the desert. Saturday, November 12, we circumnavigated the Salton Sea. Leaving Palm Springs we went south to Indio; before reaching this point we passed the house where Forrest Shattuck spent much time before his death. It recalled the several trips we made to see him and our sorrow at his too early death. His strong personableness and sense of humor made his company enjoyable from our association in Tech days until the last."

"From Indio we went to Mecca, near the northeast side of the sea. Some miles south of there we lunched on the shore of the sea at a small resort. We then drove south many miles, the sea being about 45 miles long. We turned west at the foot and joined the main highway from El Centro on the western side, returning us to Indio and Palm Springs. The next day we returned to San Marino on the famous Palms to Pines highway over the San Jacinto Mountains. We went four miles north of the highway to a famous resort 'Idyllwild,' 5,400 feet high. We had lunch at Hemet and from there drove to the sight of a new reservoir (Cajales) which will get its water from the Colorado River through an aqueduct which tunnels several mountains. We spent the night at San Marino and returned here the following day. There has been a cold spell of weather damaging the citrus fruit and now we have midsummer heat, 80 degrees to 82 degrees. Our new car runs finely and we plan to see some new places and many of the more familiar ones. Tomorrow I expect to 'listen in' to the Harvard-Yale football game. Send some more of the '91 boys out here. We want to see them."

We also quote from a later letter in January: "We have just returned from a week in Berkeley, having helped Marg move from San Francisco. . . . She bought a car while we were there to take her to her work in Oakland. We tried several times to get Ernest Hersam, but since Mrs. Hersam's death he is not so much at home. In a few weeks we will go up again and will see him then. Bob and Catherine start about the 20th to take a trip to the West Indies to be gone about three weeks, and we are to look after the children during their absence. We are having pleasant cool days and the gay season is beginning. Tuesday we had the Los Angeles Philharmonic Orchestra, with two more concerts to come, also the 'Ballet Russe,' Josef Hofmann, Pasquier Trio, and Isaac Stern, the famous boy violinist. Each week we have our music at one of four houses to play the fine symphony records."

George Spooner has retired from his work with the Schedule Rating Office at Newark, N.J., but will continue to be

available for consultation and advice. He has been with this insurance rating office for many years (won't try to figure out how many) in general charge of properties equipped with sprinklers and public service properties. His knowledge and ability in this special work were broadly recognized. It has been the Secretary's good fortune to have business contacts with George over the years. He acknowledged my letter and stated that he had "rather mixed feelings" on being taken out of active business but, as he says, it was "a nerve-racking job" and his happy disposition will help him make the necessary adjustment. The trouble most of us have who are still in active business is to taper off and reduce the strain. Either you stay on the job and continue the daily grind or you quit, and neither seems wholly satisfactory.

A letter from George Hooper commented on our hurricane experiences, but that now is a thing of the past for most of us. It happens that this morning we came to a final settlement with the insurance companies on windstorm losses to our Auburn, R.I., and Providence, R.I., plants and will collect over \$50,000, which is quite a tidy sum for substantially built brick buildings and is the first large loss from any cause to any of our properties.

We have received the following changes in address: George W. Chickering, 67 Stearns Street, Westwood, Mass.; Dr. Margaret E. Maltby, 430 West 116th Street, New York City; Elisha B. Bird, 7712 35th Avenue, Jackson Heights, Long Island, N.Y.; Charles W. Ricker, Cia Cubana de Electricidad, P.O. Box 1715, Havana, Cuba; J. Gifford Thompson, 152 Harvard Street, Brookline, Mass.; Professor Arthur C. Smith, Plaza Hotel, Minneapolis, Minn.; Lewis A. Dunham, 32 West 40th Street, New York City. — HENRY A. FISKE, *Secretary*, Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I. BARNARD CAPEN, *Assistant Secretary*, Early Convalescent Home, Cohasset, Mass.

1893

On January 23 George B. Glidden was elected president of the Massachusetts Memorial Hospitals — an institution to which he has given unremittingly of his time and effort for 17 years. Opened in 1871 as the Massachusetts Homeopathic Hospital, with 16 beds, the institution has grown steadily in size and reputation until today, with its 500 beds, it is among the largest — probably the second largest — charitable hospital in New England. It was through his father-in-law, Dr. Conrad Wesselhoeft, one of its founders, that Glidden became interested in this hospital. Elected to the board of trustees in 1922, Glidden was also made secretary in 1924, second vice-president and secretary in 1929, vice-president and secretary in 1932, and now, seven years later, president.

His service has been far from perfunctory. Several years ago, owing to lack of funds and a mounting deficit, there was a general feeling among the trustees that

Plan to attend Alumni Day at M.I.T. on June 5

1893 Continued

the institution should close. Glidden with one other member of the board fought through many meetings to continue the hospitals and finally won out. Then they decided to "let George do it." He was appointed chairman of a committee to institute changes which would reduce expenses and increase income, and at the same time he was made chairman of a drive to raise \$100,000 to meet the deficit. The changes and the drive were successful, and in 1934, when it seemed wise to build a new building which would house an increased number of private patients, he was appointed chairman of the building committee. George put it over, and the new surgical department in this building, a last word in hospital construction and equipment, was formally opened in January, 1936. Glidden's intensive efforts through many years in this deserving cause have been crowned with success. — (F. H. F.)

Charles F. Hopewell, electrical research engineer, who maintained laboratories at Watertown, Mass., died at his summer home at Wolfeboro, N.H., on October 17. Although he had retired from active work in 1935, he retained his scientific interest in electrical research and had achieved a reputation as an inventor. A student of electrical engineering with the Class, he took his S.B. degree in 1894 and spent the following winter making boiler tests at Sanford, Maine. In 1895 he was employed in the generating department of the Stanley Electric Manufacturing Company at Pittsfield and that fall was appointed to the dual positions of inspector of wires and superintendent of lights for the city of Cambridge. Upon the merging of these two departments in 1899 his title was changed to city electrician. He resigned his municipal position in 1903 and for three years did experimental work on gas engines, maintaining a machine shop for that purpose. In 1906 he joined Hopewell Brothers, manufacturers of automobile specialties, of which he became managing partner. During the World War he established an experimental laboratory for the development of carburetors, concerning which he furnished data to the Bureau of Standards. He also trained some of the wartime aviation engineers in dynamometer engine testing at the Technology laboratory. He was a member of the American Institute of Electrical Engineers, the Society of Automotive Engineers, the Oakley Golf Club, the M.I.T. Faculty Club, and the Engineers and Unitarian clubs of Boston. In 1915 he married Miss Vera E. Stiebel, a Radcliffe graduate of the class of 1907. They maintained their home in Watertown and had a summer camp at Wolfeboro, N.H., at one of the most charming scenic spots on Lake Winnepesaukee. He is survived by Mrs. Hopewell; a brother, Henry C. Hopewell; and a sister, Mrs. Mabel G. Casselberry.

A gift of approximately \$200,000 which eventually will go to the Institute is striking evidence of Charley Hopewell's deep loyalty to Technology and to our Class. Under his will, after bequests to relatives and others, the residue of the estate is left to Mrs. Hopewell for life.

Upon her death and that of his sister, Mrs. Casselberry, the residue will go to the Institute to perpetuate the memory of his parents, John and Sarah W. Hopewell. One half of the income of this trust is to be used by M.I.T. for technical and scientific education or research, and the other half is to be added to the principal, which will be known as the Hopewell Fund. In addition, after the death of Mrs. Hopewell, Technology is left a \$10,000 scholarship for any heir of the testator's parents, or, if there be no heir, for anyone whom the trustees may choose.

Late in January the Class Secretary, accompanied by Mrs. Fay, sailed from New York on the S.S. *Exeter* of the American Export Lines for a short trip to Italy, repeating in part the extended Mediterranean cruise which they took two years before. They are due back in Boston early this month. Before sailing, Fred Fay resigned from the Boston City Planning Board, of which he had been a member for 20 years and chairman for 17; and he resigned also from the Metropolitan Planning Division of which, for several years, he had been vice-chairman and acting chairman. He still retains his membership on the Massachusetts State Planning Board and the New England Regional Planning Commission.

Changes of address: John C. Hawley, Delray Beach, Fla.; Professor Ervin Kenison, 293 Mount Auburn Street, Watertown, Mass. — FREDERIC H. FAY, Secretary, 11 Beacon Street, Boston, Mass. GEORGE B. GLIDDEN, Assistant Secretary, 551 Tremont Street, Boston, Mass.

1894

The inexorable Editor refused to hold up the February issue for my belated notes but kindly let me in for the "odd-numbered" March issue. This will give an opportunity to emphasize the coming reunion, our 45th, and to add the grist of personal items which I have been able to collect. As to reunion, it is pleasing that there seems to be a distinct feeling of anticipation among our fellows, not only among those who have been in attendance at earlier reunions but also among some who have not been able to be with us in our earlier five-year celebrations. This is as it should be. One thing more is needed and that is that every man who hopes to come should try to get the men he especially hopes to see to be with us also. That would ensure a grand time. The local members will soon have some general plans to suggest which we hope will be universally acceptable. Of course we shall all desire the plan to include Alumni Day at the Institute as that will give opportunity to meet many friends of other Classes as well as a chance to see the newer developments and buildings.

Now for a few notes: Dean Lobdell '17 recently brought from San Francisco a cordial personal message from Austin Sperry (2534 Warring Street, Berkeley, Calif.). Sperry also sent in his card indicating that he is hoping to come on in June and bring his wife. As Austin has not been back since graduation, he will be like a returning hero, but he can (I

THE TECHNOLOGY REVIEW

trust) still show his wife the old buildings on Boylston Street. He says he is especially anxious to see Will Bovey, Arthur Clement, George Sherman, Henry Copeland, "and others." That means all of us. Sperry sends the sad news of the death of Prescott Coolidge at Carmel, Calif., on January 14. The Secretary had a few days earlier received a card from Coolidge's son stating that his father had suffered a stroke and was not expected to survive. We shall all remember Coolidge as he was — tall, erect, and of fine personality — and we shall also have deep regret at his passing. The sympathy of the Class is hereby extended to his family.

Through a newspaper dispatch from Atlanta news has also been received of the suicide of John L. Nisbet, widely known as a real estate dealer and former railroad president in Georgia and Florida. Nisbet came to M.I.T. from the University of Virginia and joined the Class in the third year but did not receive a degree. He was for some years in newspaper work in St. Louis and Washington. — Another death which will give sorrow to his classmates is that of R. Waldo Gilkey who died at Falmouth, Mass., on December 27. After a busy engineering experience Gilkey had retired a year or so ago and had made his home in Falmouth since that time. He was a fine character.

Indirect news has recently come regarding Sam Reed, who is still a landed proprietor in Oregon, owning and operating a large tract along the coast, including the popular summer resort of Nehalem. It is hoped that Sam can be induced to come to Boston in June. — John E. Wray is sports editor of the St. Louis *Post-Dispatch*. He says he hopes to come. So also does George N. Leiper, whose address is 312 South Broad Street, Philadelphia, and who says he especially wants to see Sam Reed and Earl Jenckes. Horace Crary, ever faithful, will be here from Warren, Pa. Another hopeful is Charles B. Beach of 285 Alpine Street, Dubuque, Iowa. Beach has not been seen in these parts since 1894, and many are anxious to see him. Luther Nash writes from Ridgefield, Conn., that he is planning to come, and Ike Hazelton hopes to come and wants to see everybody. Zimmermann says he wants to see "the splendid progress the great Institute has made." Leonard Tufts hopes he may get away on his annual trip North in time to be with us. Pinehurst is apparently more than a winter resort and keeps Tufts on the job. Arthur Tidd "may attend," and we trust nothing will prevent. Harry Bates from Atlanta and John Nowell from San Mateo, Calif., are also looking this way, as are Earl Jenckes of Wyomissing, Pa., and Arthur Partick of 126 Columbus Street, Elyria, Ohio. More anon through other channels. — SAMUEL C. PRESCOTT, Secretary, Room 10-405, M.I.T., Cambridge, Mass.

1895

These notes are written from Clermont, Fla., in January. It is a perfect day; looking over the placid waters of Lake

1895 Continued

Minneola through the blooming poinsettias and hibiscus, in the distance groves of oranges and grapefruit, all bathed in the golden sunshine of the South, this indeed presents a perfect picture. Sojourn in Florida when the opportunity presents itself and you will experience an inexpensive and most enjoyable diversion.

George Defren on December 26 passed away after an extended illness at his home, 289 Park Street, Newton, Mass. George was graduated with our Class and the following year secured his M.S. degree with the Class of '96. He was noted in his chemical work, being associated for a time with the Avery Chemical Company of Boston, and for many years was a prominent consulting chemist in connection with the brewing industries. His publications cover articles on starch hydrolysis by acid-sand diastase, articles on brewing technology, and on the application of lactic acids to foods. Among the professional societies he had membership in the American Chemical Society, American Association for the Advancement of Science, and the American Institute of Brewing Technology. Socially he was affiliated with the Masonic Orders, Hunnewell Club, 8 O'clock Club, and the Twentieth Century Club.

Born in Cincinnati, Ohio, April, 1874, he was married to Florence Edson Smith in 1901. Surviving him are Mrs. Defren; two daughters, Mrs. Lorraine Frankland of Plymouth, Mass., and Mrs. Franklin Park, Jr., of Westfield, N.J.; a son, George Defren, Jr., of Boston; and two granddaughters. Funeral services were strictly private. Defren was always an enthusiastic class member, attending the reunions whenever his business affairs permitted.

A letter from John Gardiner states that "it has been a shock to learn of the death of Richard Brinsley Sheridan at his home in Ossining, N.Y., on January 22. From the very beginning Sheridan was always regarded as one of the brilliant men of the Class, and his career justified this opinion. He had a genius for organization, and as vice-president in charge of production for the New York Air Brake Company and the American International Corporation he contributed much to this phase of engineering in the great expansion of industry since the beginning of the century. He was a true friend and loyal member of the Class." The following quotation from the New York Times supplements Gardiner's comment: "... Mr. Sheridan was born in London, England, a son of the late Henry Brinsley Sheridan of London and of Mrs. Clara Kimball Sheridan of Cleveland, now a resident of Ossining. He studied at Yale University and was graduated from Massachusetts Institute of Technology in 1895. Before engaging in business in New York Mr. Sheridan was for many years an executive of the Brown Hoisting Machinery Company, Cleveland, and represented that firm in Russia and in England. He was a member of the Bankers Club of New York. Also surviving are his widow, Mrs. Marguerite Shelley Pechin Sheridan; a daughter, Mrs. Stuart B. Carter of Buchanan, Va.,

and two brothers, Colonel H. K. Sheridan, U. S. A., retired, and C. K. Sheridan, both of Cleveland." — LUTHER K. YODER, Secretary, 69 Pleasant Street, Ayer, Mass. JOHN H. GARDINER, Assistant Secretary, Graybar Electric Company, 420 Lexington Avenue, New York, N.Y.

1896

As the date arrived for preparation of these notes, January 24, the Secretary found that the outlook was not very promising for much volume, but fortunately on that very day two events of note occurred. First, Billy Haseltine from Ripon, Wis., called in person. His stay was all too brief, but there was opportunity for lighting up respective pipes and having a little chat. Billy was making one of his periodical trips East, partly on business and partly on family affairs. He had been down in Maine and was headed for the West. One of his sons is in Harvard Medical School, and of course one of Billy's objectives was to see this boy. Another son, who received his advanced degree at M.I.T. a year ago, is now located in California. Billy reported that his business showed definite promise of being on the up grade.

The other event of January 24 was receipt of a copy of the Brockton *Daily Enterprise* of January 21, announcing that on the very day of issue the traveling Fullers had sailed on another trip round the world, going by way of Cuba and the Panama Canal, and visiting a number of the island groups in the Pacific Ocean and also in the Indian Ocean. They plan to travel leisurely down the east coast of Africa and up the west coast, again including various islands, such as St. Helena. They are scheduled to arrive in Southampton about June 1 and will come from there directly back across the Atlantic.

A letter from Charlie Lawrence reports that he is now back with his son in Baldwinsville N.Y., but he does not really give any news. — Admiral Bakenhus planned a get-together of the '96 bunch around New York at the Engineers' Club, 32 West 40, on February 14. — A letter from John Tilley reports that his company, Marc Eidlitz and Son, Inc., is erecting one of the buildings for the New York World's Fair, which is keeping him busy. It is understood that John can arrange for a pass, so that if there is any '96 man visiting New York this spring and desiring a preview of the fair before it is officially opened, John may be able to help him.

Although it is a little bit late the Secretary would like to record his pleasure in receiving cards from various classmates at the Christmas season, including Mark Allen, Admiral Bakenhus, Gurney Callan, Winthrop Chenery, Clark Holbrook, Jim Melliush, Norman Rutherford, John Tilley, Charlie Tucker, and Willett Wood. Chenery's card featured a snapshot of himself and indicated that in his status of retirement in Los Angeles he was maintaining his size and vigor. Holbrook and his wife are as usual at Miami Beach for the winter. Rutherford is now located on Long Island.

Rockwell received letters from Stanley Howland at Asheville, N.C., and Bakenhus in New York City. The latter reported that he was still keenly interested in fencing and keeping it up two or three times a week. Naturally he wants to see fencing continue active as one of the student sports at M.I.T. Howland wrote John that he was getting along about as usual and holding his own. He referred pleasantly to the visit made by Dr. and Mrs. Rockwell to him during the past year, but he stated that he did not see any prospect of getting to New England himself.

The Boston *Globe* in December contained the following interesting paragraph: "Professor E. C. Jacobs, Head of the Geology Department of the University of Vermont, is exhibiting in the Fleming Museum a set of ivory chessmen carved in China more than fifty years ago, and of special interest because of the exquisitely carved ivory balls on which the figures stand." Many of us will recall that Jacobs' father was one of the old-time sea captains sailing his square-rigger to all parts of the world and, like all such captains, collecting treasures and relics from the Orient. In fact Jacobs himself when very young sailed with his father and mother on some of these long voyages.

The Secretary has learned with much regret of the death on March 21, 1938, at Centerville, Mass., of our classmate John S. Whitaker. He was here only one year as a freshman in Course III and therefore did not become well known to a large number of classmates, and he had never taken any particular interest in class affairs or in Technology affairs. He was born March 30, 1871, at Grantham, Vt. His mother was Mrs. S. J. Harlow Whitaker. He was married in 1897 and had two children. He was with the General Electric Company from 1896 to 1903 and was superintendent of the Rockingham County Light and Power Company at Portsmouth, N.H., from 1903 to 1913. He retired in 1913 and had been living in Centerville ever since.

It is not too early for classmates to be thinking about Alumni Day, which is scheduled for Monday, June 5. A. Warren Norton '21, chairman of the Alumni Day Committee, promises us an even more attractive program, if such is possible, than last year. The Secretaries urge all '96 men to give this matter careful consideration and come if you possibly can. At that time the World's Fair in New York will be open. Many classmates will very likely visit this exhibition. It is understood that the railroads will have an arrangement whereby people visiting the fair from other than local points may arrange to have their tickets read via Boston, with very little, or practically no, additional cost. Please make a note of this and put June 5 down on your calendar as a very important day for M.I.T. Alumni in Cambridge. — CHARLES E. LOCKE, Secretary, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, Assistant Secretary, 24 Garden Street, Cambridge, Mass.

Plan to attend Alumni Day at M.I.T. on June 5

1897

Within the last month we were advised of the death of our classmate Edwin Dodge, who was graduated with the Harvard class of '95 and was at Technology two years, graduating from the Course in Architecture in 1897. Those who knew him remember him as a most delightful personality with an abundance of ready wit and kindness. He was a member of the Dodge family of Newburyport, Mass., who were for generations in the shoe business there. He was twice married and spent much of his time abroad. His second wife, the former Mrs. Childs, survives him and is living in Dedham, Mass.

On January 17 Edward Sturtevant, aged 62, Secretary and Treasurer of the corporation of St. George's School and a faculty member of the school for 40 years, died at his home in Middleton, R.I. He was the son of the late Eugene and Mary Clark Sturtevant of Newport. He was a graduate of Course IX, and while of a very retiring disposition, to those who knew him well he was an unusually fine type and loyal friend.

Your Acting Secretary got a letter from Arthur Hopkins recently in which he said he was dividing his time between business trips and selling real estate at Wellfleet, Mass., where he makes his home in the old family homestead. With the ever growing popularity of the Cape, he finds that he has been able to build up quite a real estate business.

In order to keep this column up to the minute it is necessary that we get some items of news from our class members. We urge you to send in news items, which will receive our usual prompt attention. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass. CHARLES W. BRADLEE, *Acting Secretary*, 30 Kilby Street, Boston, Mass.

1899

From Miles Sherrill I have received the first enthusiastic response to my proposals concerning the reunion celebrating the 40th anniversary of our graduation from Technology. He has several suggestions which I shall pass on to you in due course through a circular letter. Now I quote from the chorus of our class song written by Walter Adams for our 17th anniversary celebration which coincided with the big all-Technology reunion when the new buildings on the Cambridge site were dedicated:

"Old friendships, like wine, improve each passing year, So bring a hearty greeting to every Tech man here. For the sake of Auld Lang Syne, Get back, boys, get back, boys, to the days of ninety-nine."

Modestly Miles closes with the news that the completely rewritten edition of "A Course of Study in Chemical Principles" by Noyes and Sherrill was published by the Macmillan Company last fall. About half of the book was completed at the time of Dr. Noyes's death, and it devolved upon Sherrill to finish the manuscript.

Edwin A. Packard has written me that he spent some time in Los Angeles on business during the autumn and returned to New York via Washington. He called me on the telephone and found me out of town, for which he was sorry. So was I. Packard hopes to attend the 40th anniversary celebration of our graduation which we are planning to hold in June. He expects to bring Mrs. Packard.

In a letter from Waddell from Bethlehem, Pa., he tells me he has two granddaughters. One is one and one-half years old and the other, two months. Waddell intends to attend the reunion in June if we have it, even if he has to go alone. He had hoped to have his son with him, but the latter, who was graduated from Tufts in 1934, is getting his master's degree in chemical engineering at Brooklyn Polytechnic next June. Waddell says that any vacation he may have will have to be devoted to service in the Reserve Officers Training Corps of the Chemical Warfare Service, where he is an officer.

Philip Burgess of Columbus, Ohio, sent me his dues, his promise to attend the reunion with Mrs. Burgess, his condolences, and his best wishes. He doesn't think the tale of day-by-day living is much in the way of news and expressed sympathy for me in my efforts to get news. As he had no personal news he told me his locality had been helping Mr. Roosevelt spend some of our money for public works. Between them they have done very well. The money is spent. A couple of years ago Burgess had charge of erecting a new water plant at Biddeford, Maine. The location did not seem to have a very firm foundation, so the contractor sent for Ray Bennett (who is the same old Ray according to Burgess) to go out with his pile driver and drive piles to anchor the foundation of the water plant. Success seems to have attended their efforts. Burgess is still playing golf and asked if Ferguson had kept up his game, or whether his wife held him to his promise not to play.

Just recently news reached me of the death of Harry Leonard Morse at the Chelsea Naval Hospital on November 27. It is with regret that I pass on this item, and also the notices of deaths of John Woollett in California in February, 1938, and of Lawrie Turner's wife in December.

Arthur B. Foote has been to Europe. At least I assume that he has because a letter mailed to him at his Grass Valley, Calif., address in August has now been returned to me after traveling about France and back to the good old U. S. A. — David H. Hayden is now receiving mail at R.F.D. No. 1, Sarasota, Fla. — Arthur Hamilton is spending the winter in Boston at the Hotel Somerset. — W. MALCOLM CORSE, *Secretary*, 1901 Wyoming Avenue, Northwest, Washington, D.C. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston, Mass.

1900

Notice has just been received here of the death, on February 22, 1935, of Henry H. Albin, VI, at Lebanon, Pa.

After leaving the Institute in 1900 he served as treasurer of the Sullivan County Railroad and later as an official of other Boston and Maine subsidiaries; thence, to Illinois Traction System, Westinghouse, and Lebanon Valley Light and Power Company, serving as president and general manager of the latter.

Professor Locke '96, Secretary of the Alumni Association, kindly sent in the following: George Tweedy, III, is now back in his old stamping ground in Mexico, and his address is Minas del Tajo, Rosario, Sinaloa, Mexico. He is director general of Minas del Tajo and also general manager of the Mexican Mines Company with property at Bolanos, Jalisco, Mexico. His son, George, Jr., has been at the University of Montana at Missoula, Mont., and is planning to enter M.I.T. and take work in mining engineering and metallurgy.

If any one knows the present address of Harry L. Hunt, who was in Course VI, will he please send it in? Our last address was 908 Broad Street, Stratford, Conn. — Word was received here a few days ago of the death of Mrs. Helen G. Dunbar, widow of Howard R. Dunbar, II, who died in 1936.

We are indebted to Ralph Whitman '01, Captain, Civil Engineering Corps, United States Navy, Washington, D.C., for the following announcement: "Lieutenant Commander Charles L. B. Anderson and Mrs. Arilda Ellen Andrew announce their marriage, Saturday, the twelfth of November, Nineteen hundred and thirty-eight, Mare Island, California." Whitman goes on to say: "I send you with this an announcement of the marriage of your classmate at M.I.T., C. L. B. Anderson. As Secretary of your Class I thought it might be of interest to you if you had not already received the information. Anderson and I were in the same German section back in 1898-1899. We were on duty together at the Norfolk Navy Yard in 1925-1926 and together again at the Navy Yard at Mare Island, Calif., in 1934; so we are old friends. You probably know of the death of his first wife — in 1936 I think. The inclosed announcement came to me in December — somewhat later than the date of the marriage would indicate — and I laid it aside with the idea of sending it to you after I had made some other use of the information. I am sorry for the delay. Anderson's present address is United States Navy Yard, Mare Island, Calif., in case you haven't it and want it. He has been there since May, 1934. While that is a rather long tour of duty for a navy officer, I have heard nothing of any plan for moving him. Under present law he will be retired for age (64 years) on April 30, 1940, and I would say that there is a fair chance of his staying at Mare Island until that time. In any case, the address would be good indefinitely. The Navy forwards our mail for us very effectively, and of course our whereabouts are always known."

The Boston Herald of September 26 carried an article relating to an interesting interview with the noted traveler and lecturer, Mrs. Claude U. Gilson, in which

1900 Continued

she gave her observations of the situation in Prague where she had spent the summer. Mrs. Gilson is the widow of Gilson, II, who died in 1916. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

In the February Review brief mention was made of the death of Hal Kennedy at East Hampton, Long Island, on October 24. Subsequently Al Higgins, who had written to Kennedy in the belief that he was still living at East Hampton, received a brief letter from Hal's brother, R. G. Kennedy, which read as follows: "Hal retired from the Telephone Company the first of October, 1937, and spent the winter in California. His health was poor all winter, and the floods were the finishing touch, so he came East and settled near me here at East Hampton last April. He got through the summer fairly well, but his heart went bad in September and he was unconscious most of the time during his last three weeks." There were no other particulars relative to his business life or family, so will hope that some one of the fellows who has kept in touch with Hal will send in further friendly comments for these notes.

Al Higgins wrote in from St. Petersburg, Fla., where, as noted in the December Review, he makes his headquarters as president of the Florida Power Corporation, and again indicated that he felt St. Petersburg was the best place in Florida to establish a colony for the (re)tired businessmen of the Class. Al also mentioned that he had recently met a former associate of Ed Davis with the Scovill Manufacturing Company at Waterbury, Conn. — one Henry W. Adams who apparently now makes his home at St. Pete but who previously was at Waterbury and held Ed Davis in high esteem. Naturally, knowing Ed as well as we do, that does not surprise us, for he has a host of friends both in and out of the merit system. Incidentally, when Ed sent in his class news sheet he mentioned that he put in last summer's vacation by way of a trip to England and a tour of the southern counties, notably Devon and Cornwall. He made no other comments except to say, "Let's call a class reunion over there," so he must have found some attractive spots and perhaps is withholding further remarks as to how the indigent members of the Class can arrange to finance such a trip.

Another class traveler — namely, Fred Clapp — whose peregrinations as a consulting geologist have frequently been referred to in these notes, writes that on November 10 he "returned on the S.S. *Normandie* from a nearly continuous absence of almost three years in Iran and Afghanistan, having had charge of extensive geological explorations covering 800 miles of latitude and 1,000 miles of longitude, extending east from Damghan and Yezd, Iran, across Afghanistan to the border of India; bounded on the north by the Oxus River and Turkomen Plains and on the south by British Baluchistan." While in England, Fred was invited to

deliver a lecture on "Explorations in Eastern Iran" before the Royal Central Asian Society and the Iran Society in joint session. This lecture was held on October 28 in Burlington House, in the Royal Societies' Hall, Lord Cadman presiding. Since returning to the United States, where he makes his office, as before, at 50 Church Street, New York City, he has delivered two papers at the convention of the Geological Society of America. The first was the "Geology of Eastern Iran," comprising the scientific results of the recent explorations. The second was "The Problem of Petroleum," delivered at the request of the society on the occasion of its 50th anniversary. These papers will appear as bulletins of the society in the near future. Fred should know his oil, and we most enthusiastically hope that he can be with us at our 40th class reunion to give us too a talk on his interesting and instructive travels.

We have heard recently also from a long lost and far-distant member of the Class, namely, Horace Johnson, V, of 2753 Upper Manoa Road, Honolulu, Hawaii. Horace was not very generous with his news but under the caption "Present Occupation with Comments?" did write: "None! — waiting for the Townsend Plan to go through." Perhaps we may see him at the 40th class reunion and he can then tell us all about the joys of living in Honolulu.

There are other interesting news items waiting to be released, but as these notes for the March Review had to be hand-written, further class comments will be carefully preserved for later editions of The Review. — ROGER W. WIGHT, *Secretary*, The Travelers Fire Insurance Company, 700 Main Street, Hartford, Conn. WILLARD W. Dow, C.P.A., *Assistant Secretary*, 20 Beacon Street, Boston, Mass.

1902

We mentioned a few weeks ago that Lind had been nominated for the office of president of the American Chemical Society. We now report that he has been elected. Congratulations from the Class. Dan Patch has been out in Minnesota and wrote from St. Paul that he hoped to see Lind among the other Tech men he was meeting. Patch rates as traveling ambassador for '02. — Montgomery has rendered his report as treasurer and records that some 49 members are paid up for last year, giving the Class a nest egg of \$183 for the next reunion. — Five of our Class were present at a lunch meeting of the American Society of Civil Engineers on January 19 at the New York Technology Club: Bassett, Gannett, Fruit, Manley, and Hansen. — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston, Mass.

1903

Three of our Class traveled in Britain and in Europe last summer, and they have brought back interesting commentaries on the situation. While these comments may be either verified or disproved by the time these notes appear, I think

others might be as interested as I was in our Secretary's observations: "France, where I landed, seemed to me in an extremely unsatisfactory condition . . . and the outspoken manner in which the Communists proclaimed their political desires and their disregard for the good of the country as a whole, was astounding to me. I was particularly shocked by the boldness and extreme nature of the posters they display on all bulletin boards. The common people seemed indifferent to the danger facing Europe and inclined to shrug their shoulders and do nothing. I got the impression that they clearly did not want to fight."

"Belgium and Holland seemed more awake to the danger facing Europe, and also busier, but neither was in any marked state of activity; business was declining. I was interested to note that some men were crossing from these countries into Germany to find work. A shortage of skilled labor was reported in Germany. In England and Scotland I found the keenest realization of the danger facing Europe and a great determination to try to prepare for eventualities. . . . Business was declining but was still fairly active compared to conditions in this country. Just before sailing for home I spent a week at the Colonial Exposition at Glasgow. I found it interesting and well presented. The best parts for me were the exhibits from the larger Dominions — Canada, South Africa, Australia, and New Zealand. The entertainment section I thought definitely less amusing than what we provide on similar occasions."

Joyce wrote from the Lion Hotel, Guildford, England, on August 19: "I have been touring England since August 1 with George Greene's Life Buoy shaving cream in a Prouts Liverpool Wolsley 12 H.P." He comments further on the opposing effects of the waters of Harrogate and an excessive number of meat courses at dinner. The radio is apparently beating the old-fashioned crier and his bell in distributing the latest news to the populace, much to the crier's disgust.

Early in the summer we had a pleasant call from Newman, I, whom we hadn't seen since graduation. He was stopping overnight in Boston on his way to Europe, having driven across the country from Los Angeles in eight days. On September 10 he wrote us from the S.S. *Georgic*, on his way home, saying that the two months since leaving Boston "have gone rapidly and been most varied in the happenings and places visited." Being a construction engineer, he was most interested in construction work in France and Scotland, particularly mentioning the observation tower at the Empire Exhibition at Glasgow, the Korda motion picture studios outside London "built in good Hollywood style," Reims Cathedral "having the final touches applied by Rockefeller money in its restoration from war damage," the statues of Lafayette and Pershing outside Paris, the docks at Le Havre, the Maginot Line, and adding that it was "a tremendously interesting time to be overseas."

Plan to attend Alumni Day at M.I.T. on June 5

1903 Continued

Frank B. Jewett spoke at Rockford College in February under the auspices of the William Arthur Maddox Foundation. — G. F. Loughlin, chief geologist of the United States Geological Survey, was in Boston recently, conferring with officials of the Massachusetts Department of Public Works in regard to geologic mapping of various areas and the preparation of reports for road-building projects.

J. Howard Pew, II, President of the Sun Oil Company, gave the Fuller lecture before the students of Worcester Polytechnic Institute in January. He spoke particularly of economic planners and planning, and present thinking in connection with our American system of free enterprise, and among other things said: "When I speak of free enterprise at its best, I mean when it is entirely free — free of monopoly, private or governmental; free of government control or intimidation; free of trade agreements that would control prices and production after the manner of the European cartel system. . . . There is no surer way of ruining a nation than for the government to plan for the lives and activities of its people, for a nation can be no greater than its people." — **FREDERIC A. EUSTIS**, *Secretary*, 131 State Street, Boston, Mass. **JAMES A. CUSHMAN**, *Assistant Secretary*, 441 Stuart Street, Boston, Mass.

1905

Before leaving office on December 31, Governor Hurley of Massachusetts attempted to depose our Assistant Secretary by nominating in his stead another man as a member of the State Board of Housing, of which Sidney T. Strickland, IV, had been a member for five years. The President of the Boston chapter of the American Institute of Architects promptly busied himself in Sid's behalf, and Sid (who is no amateur in the political game) also pulled ropes, with the result that the Governor withdrew his favorite, and the Housing Board is to have Sid's valuable services for another five years. — **Walter Eichler, II**, writes that he is now chief draftsman for the Ludlow Manufacturing and Sales Company, Ludlow, Mass., commuting to Boston on week-ends. Hope he keeps his threat to attend a class meeting sometime.

C. Dean Klahr, II, says that he is still in the contracting game at Erie, Pa. With a Lehigh man as partner, he has been doing considerable road and bridge work. C. D. reports four children, a girl of 11 years and boys of 13, nine, and seven years, which, as far as the Secretary knows, gives C. D. the record of having the youngest child in the Class. Any challengers? — **Errett M. Graham, I**, writes regarding his recent change of address to 1118 Kossuth Street, La Fayette, Ind.: "It just happens that the employing Chicago, Indianapolis and Louisville Railroad decided to consolidate all engineering forces at La Fayette, Ind., and do away with the Chicago office. It's an economy measure. As I can get more time at home than under the previous arrangement, I am not disposed

to object. Title and remuneration as before. Other Chicago general offices are also unchanged. La Fayette is a pleasant and friendly town and the Wabash River — right at hand — provides many an outing."

Our Roxbury Latin alumnus and correspondent informs us that the classiest interscholastic meet in Boston takes place at the Tech Gym at 1:00 P.M. on Saturday, March 4, at which time the cream from Roxbury Latin, Moses Brown, Noble and Greenough, Brown and Nichols, Milton Academy, Country Day School, and Governor Dummer Academy face the starter's pistol. This correspondent, who was on the '05 relay team and persuaded several '05 fathers to bring their lads last year, states that M.I.T. in sponsoring this meet permits any '05 man to bring to it a son or a boy who should go to M.I.T. It's a great chance to show prospective entrants around, have lunch at Walker, and see a very interesting struggle. **Andrew Fisher, X**, has promised to meet the Secretary there and assist as a guide.

Since several '05 men have had daughters recently at Colby Junior College, they will be interested in the following news notice in regard to an '05 daughter: "Mr. and Mrs. Edward J. Poor of Lowell Street, Peabody, announced the engagement of their daughter, Miss Marie L. Poor, to Mr. Thomas J. Ehleider, Jr., son of Dr. and Mrs. Thomas J. Ehleider, of Poughkeepsie, N.Y., at a tea at their home yesterday. Miss Poor attended the Roberts Beach School in Catonsville, Md., and is a graduate of Colby Junior College in New London, N.H. She is now a student at the Leland Powers School of the Theater. Mr. Ehleider received his bachelor of science degree from Wesleyan University in 1936 where he was a member of the Beta Theta Phi fraternity. He is now in his second year at the Harvard Dental School."

We just have the sad news that **George E. Turner, II**, died at Redlands, Calif., on November 10. George was born in St. Louis, entered M.I.T. with us, but left in his sophomore year to enter West Point, from which he was graduated in 1906. He was in the Coast Guard Service (captain) in 1916, taught military science in a government school in Honolulu, and retired several years ago to California where he had a large orange grove. Also we learn that **Grace M. Swanson, VII**, died in February, 1936. She was then Mrs. **Kenneth B. Rowley**. — **FRED W. GOLDTHWAIT**, *Secretary*, 274 Franklin Street, Boston, Mass. **SIDNEY T. STRICKLAND**, *Assistant Secretary*, 75 State Street, Boston, Mass.

1907

In a letter received from John Frank on January 10 he wrote that Sam Marx was in Palm Springs, Calif., where he is the architect for a big department store job. (We received a uniquely attractive Christmas greeting card from Sam and his wife.) John also gave the interesting news that Stud Leavell married again in midwinter and was on a South American cruise.

We appreciated the New Year's greeting card from **Marcellus Rambo**, who is a dentist in Rio de Janeiro, Brazil, South America. — **Gardner S. Gould** has moved from Edgewood, R.I., to 409 Highland Street, Newtonville, Mass., his business address now being 89 Broad Street, Boston, where he maintains his headquarters as a water-front engineer, specializing in coast-line development, breakwaters, wharves, and so on. — **Howard J. C. MacDonald's** address is Mulberry Cove, Drayden, Md., but unfortunately we are not at all informed as to his business or professional activities during recent years. — **Emerson H. Packard** is now living at 39 High Bluff Avenue, Cape Cottage, Maine. He is in charge for eastern and northern Maine of sales and application of tar products and road tar manufactured by the Koppers Products Company of Providence, R.I., office at 23 Beach Street, Portland, Maine. — **Howard S. Palmer, VIII**, has been with the New England Telephone and Telegraph Company at 50 Oliver Street, Boston, for over 30 years, in traffic and engineering work. He lives at 60 Central Street, Stoneham, Mass., has three sons and one daughter, ranging in age from 24 years to 13 years. He is quite clever in composing Limericks and poetry, being the writer of a weekly column of verse in his home-town paper under the name of "Uncle Abner." — **S. G. Emilio's** older son, Luis, who was graduated from Tech in 1936, Course II, is with the United Shoe Machinery Corporation at their Beverly, Mass., plant.

Among the '07 men whose names are included in the 1938 edition of "Who's Who in New England" is **Maurice H. Pease**. From 1907 until 1910 he held various positions with Stone and Webster and then was purchasing agent for the Indian Refining Company until 1914, when he became connected with Stanley Works at New Britain, Conn., where he has continued until the present time, now being vice-president, director, and general manager of the steel division of the company. He is also president, director, and general manager of the Farmington River Power Company, a subsidiary corporation. Maurice has a daughter 18 years old and three sons, all younger, the family home being on Lincoln Lane, New Britain.

In the November Review we told of the trip to Europe that Harry Moody was planning. In response to our letter to him in December asking for comments on his experiences, we received the following, dated January 12: "I do not know just what you want me to say regarding my European trip. Mrs. Moody and I left on the S.S. *Normandie* on September 28 which, as you will recall, was a day of great tension in international affairs. That was the day the Munich conference was called, and we left without knowing just where we would land or why. Of course we had frequent wireless reports and knew the situation was improving. Many people asked me why I did not postpone the trip, but I had all my arrangements made, and to have done so would have seriously inconvenienced my

1907 Continued

business plans. So we just went ahead and took a chance, which fortunately worked out O.K.

"Bob (Harry's son, M.I.T. 1934) met us with his car when we landed at Le Havre, and we divided our time among France, Switzerland, and Germany. By motoring in that way we had a chance to see the countryside and small villages in a far better manner than would have been possible otherwise. If only we in America could learn to slow down and conduct our business affairs in the manner of Europeans, I think it would be a wonderful thing. They accomplish a good deal and yet it is not attended with the terrific nervous strain that exists here. While I was there, daily life went on much the same, to all outward appearances. France had started to demobilize service troops, and of course everywhere I went there were a great many men in uniform. Switzerland had mobilized with the others, but Germany did not start to demobilize until the latter part of October.

"I spent a good deal of time in Wiesbaden, where my son is living while he is in Germany. Wiesbaden is an army air base, which meant, of course, that a great many troops were in evidence. The German people seem very anxious for the good will of most foreigners, particularly the English and Americans. One is shown every courtesy, particularly at the frontier. Our baggage was not even examined going from France to Switzerland, or Switzerland to Germany, or from Germany back into France. Germany had built some wonderful automobile roads which they call *reichs autobahn*, although they are really no better than our latest roads in this country. There is practically no unemployment in Germany. Of course the scale of living is comparatively low. Taxes are very high and there is a good deal of relief work going on, although it isn't emphasized quite so much as it is in this country.

"It would certainly be great to live on an American income in Europe at the present rate of exchange. One can get a very nice lunch in Germany for a mark and a half, which on a travel mark basis is about 30 cents. The same meal in this country would cost at least a dollar. There was a shortage of fats, and butter can be obtained only with 'butter cards.' Six months ago each resident was allowed 300 grams of butter per week, but while I was there this allowance was cut to 150 grams per week. There was no white bread but I understand, since I left, it is now obtainable. Fruits are scarce, but there is plenty of meat, particularly beef and a fairly generous supply of pork. Of course, I naturally avoided any political discussions, as I was a guest of the country, but one cannot fail to feel that sense of regimentation that undeniably exists there. However, the majority of people seem happy, have jobs, and are working. Germans I talked to said that Hitler's popularity was due to the fact that he had been able to accomplish what he had without a war, and that if war had actually come his popularity would have been diminished. Hitler was in

Munich one week-end while I was there, but there was no particular excitement, nor were there great crowds on the street when he went to keep a birthday appointment with one of the Bavarian officials.

"I have mentioned chiefly Germany in this letter, Nick, because of course that is the country in which the greatest interest centers. France, and Paris in particular, is going along much the same as ever, at least to all appearances, and Switzerland is just as beautiful as ever. The Swiss are very jealous of their little country, and it is certainly a very beautiful spot. It was a wonderfully enjoyable trip and perhaps a little more exciting than usual due to international conditions at the time. We are living temporarily at a hotel in New York City until spring, when we shall probably take up permanent residence in the suburbs." — BRYANT NICHOLS, *Secretary*, 126 Charles Street, Auburndale, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

Thirtieth reunion, Oyster Harbors Club, June 3 to 5. — A very interesting letter from Arthur Knipp is being held until next issue at the request of The Review staff, who had a problem in pagination on their hands. — From Paul Wiswall I quote the following: "I hasten to send you the inclosed announcement about the new title that Jim Critchett has assumed. When I received the news, I went down to see Jim and to congratulate him. He was just as disarming as ever, telling me with the customary Critchett modesty that his duties were to be just about as they have been. The Electro Metallurgical Company is the subsidiary of the Carbide Corporation that handles their line of alloys." Jim's election as vice-president became effective on January 1.

G. A. Joslin has been elected chairman of the Southern California chapter of the American Institute of Mining and Metallurgical Engineers for the coming year. — Lewis Johnson tells me that he is a grandfather, his daughter Mary having a young son, Peter Dudley Albertson. Lewis' younger daughter, Betty, is teaching school in Baltimore, Md. — Announcement was made recently of the engagement of Miss Virginia Ward, daughter of Mr. and Mrs. Hugh C. Ward of Beverly Farms, Mass., to Samuel Cabot, Jr. Mr. Cabot prepared at St. Mark's for Harvard, where he was graduated with the Class of 1933. He also studied at the Institute and is now associated with his father's firm, Samuel Cabot, Inc. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. *Assistant Secretaries*: PAUL M. WISWALL, MAURICE R. SCHARFF, New York; GEORGE E. WALLIS, Chicago.

1911

Our heartiest congratulations to A. V. deForest, XIII, for to him is being awarded the 1938 Sylvanus Albert Reed Award, conferred annually by the Institute of the Aeronautical Sciences for a

notable contribution to aeronautics. A. V., you know, is a professor of mechanical engineering at M.I.T. and his selection for this notable award was made, according to the committee, because of "the development of a method generally used by the aircraft industry for testing materials magnetically." His method, known as Magnaflux, makes it possible to detect forging defects as well as fatigue and grinding cracks. Its ability to locate nonmetallic inclusions in steel has led to important improvements in the manufacture of engine and propeller metals. His magnetizing method depends upon the fact that small iron particles tend to collect on cracks in magnetized steel parts, and A. V. told us at a class dinner last November that heavy currents through the material being tested greatly increase the sensitivity of the test.

This is the third outstanding honor which has come to A. V. in a period of 11 years. In 1928 the American Society for Testing Materials gave him the Dudley Medal for a paper on methods for testing materials, and in 1936 the Franklin Institute awarded him the Longstreth Medal. With his customary modesty he thanked me for a note of congratulation I sent him, adding: "We certainly had quite a nest of aeronauts around 1911 what with the worthy head of our (Course II) Department, Hunsaker '12; Frank Caldwell '12, the great propeller man; Luis de Florez '11, the great oil expert and amateur flier; and my own slight contributions."

Probably nothing delights the heart of a Class Secretary more than to have an immediate reaction from a given set of class notes. So imagine my unbounded joy when, shortly after New Year's, came a fine letter from Paul Kellogg, IX, President of Stevenson and Kellogg, consulting industrial engineers, 970 Sun Life Building, Montreal, P.Q., Canada. Enjoy it with me: "I have just finished reading a most interesting account of the 1911 dinner and the family history of those attending. I am beginning to think I haven't done so badly for I am now the grandfather of two boys, both sons of my daughter who has been married for over four years. The rest of my family history is easy to relate.

"Dorothy and I are enjoying Montreal and look forward to living here for many years. Our son, Leonard, graduates from the University of Idaho next June and, if all goes well, expects to enter Harvard Graduate School of Business Administration next fall, which circumstance may bring me to Boston or Worcester much more often than I have been able to find excuse for during the last several years. Incidentally he is majoring in mathematics — Lord help him! Business continues to be satisfactory for us. In addition to our work as engineering advisers to the newsprint industry of Canada and some other trade association work, we have now branched out into consultation work for private companies and are engaged in the installation of modern management methods in some of the largest mills in Canada. Incidentally, I hoped

Plan to attend Alumni Day at M.I.T. on June 5

1911 Continued

that we would have the pleasure of seeing more of the 1911 contingent because Montreal is such a convenient place to visit. I do hope that any classmates who come this way will drop in for a word of greeting, and may the new year be a happy and prosperous one for the Denisons, the feminine contingent joining in hearty greetings."

During the last six weeks of 1938 in the galleries of Kennedy and Company, 785 Fifth Avenue, New York City, there was an exhibition of "Gothic Memories," consisting of prints, etchings, and drawings by John Taylor Arms, IV. Included were three remarkable new etchings he made in France and England during the past year. Arms has traveled far in quest of the beauties of Gothic architecture, and his rendering, so eloquent of the medieval spirit, has placed him in the front rank of American artists. Our good friend Robert P. Bigelow, Professor in the Department of Biology and Public Health, thoughtfully supplied me with this information.

Every once in a while we lose track of a classmate, and this time it's George Garnsey, V, who for a number of years has been in Detroit. Mail has been returned from 10100 East Harper Avenue, and I find he is not listed in the 1938 Detroit directory. Any information regarding his present location will be appreciated. He matriculated from Gloversville, N.Y. Conversely, here are a few new addresses: Stanley Bates, I, 4723½ Ellis Avenue, Chicago, Ill.; F. Lester Corts, 233 Broadway, New York City; Arthur T. Gay, IV, 262 South Street, Hingham, Mass.; John Scoville, IV, McLellan Stores, 55 Fifth Avenue, New York City; and Sumner C. Willis, I — for years at Webster Groves, a suburb of St. Louis — now at Apartment 8, 3029 Clifton Avenue, Cincinnati, Ohio.

Here in Worcester, Hal Robinson, I, has just been confirmed for reappointment as a member of the Worcester Board of Survey for his third successive three-year term. And so we sign off for this month, always hoping that the well-known "w.t.d." urge will result in a sudden surge of letters containing much for future class notes. — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Worcester, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

Mr. and Mrs. Charles Rowley, II, have just announced the engagement of their daughter, Jane, to Ralph Snow, now a senior at Yale Law School. The wedding is to be in July at the Rowley Cape Cod home. You will all remember Jane as our class baby.

The following is from Harold Mabbott, II, now located at Fort Belvoir, Va.: "We returned from Hawaii on an army transport via the Panama Canal and arrived in New York on September 16. Except for a moderate hurricane off Southern California, that had the ladies ready to get in the lifeboats, the trip was uneventful. My immediate problem upon arriving

was to get my daughters in school. One is in Simmons and the other in Miss Wheelock's. We made the trip to Boston by car two days after the New England hurricane and got firsthand information of the damage done. After a week in Boston, Mrs. Mabbott and I returned to Belvoir. Fort Belvoir is the same as old Camp Humphreys known to many during the World War. The post is on Route 1 about ten miles below Alexandria and is about three miles from Mount Vernon. As a matter of fact, the post is on the site of Lord Fairfax' estate, and the old boy himself is buried about 150 feet from the house. Our quarters are on a bank overlooking the Potomac. I am detailed on the engineering board as a representative of the Coast Artillery. The engineers design and buy searchlights for the Army. Part of the job is to discourage inventors with crazy ideas. I was sorry not to have made the reunion but hope to be on hand for the next."

Charlie Carpenter, II, has been at 3535 Iris Street, North, St. Petersburg, Fla., until this month. During a brief visit from H. M. Priest, I, at our New York office, we extracted a promise from him to put something in writing about his experiences since leaving the Institute some 25 years ago. It took a little follow-up work afterward actually to get the letter, but Malcolm always was a man of his word. So here it is: "You and your secretary certainly have a smooth-working system for reminding a fellow of his promise to give you something for the 1912 news. I am probably one of the few members of 1912 who has stuck to engineering. Upon graduation I entered the Elmira drawing room of the American Bridge Company where I spent most of my time on the board but acquired an excellent training in structural drafting. The depression immediately following the opening of the World War put the plant on short time, and the limited salary I then commanded was a potent argument for attempting to improve my economic status.

"The opportunity came to go with the Chicago, Rock Island and Pacific Railway in Chicago where I landed in the spring of 1915. After a few months in the valuation department, I was transferred to the designing office of the track elevation department, which was then elevating the tracks through Hamilton Park and Gresham. For four years our office was a converted mail car, shunted around from siding to siding as the work progressed. It was an inferno in the summer, an Arctic region on winter mornings, but a busy place at all times. Dan Tomlinson was with the Chicago and Western Indiana in those days, and I saw him on many an occasion.

"During the War I was with the Air Service at McCook Field in Dayton, Ohio. We were working on the structural design of airplanes, testing them for strength and developing new construction. Tech men were numerous at the airport, and Caldwell was the expert on propellers — a field in which he is still active, I believe. At least I recently saw a

picture of him standing in front of a new three-bladed propeller. Boulton '16 and I wrote a book for the division on structural design, a work which modern developments would relegate to the kindergarten. With the slackening of activities at McCook I returned to my first position with the American Bridge Company. It has often been said of the steel business that it is either 'a feast or a famine,' and the famine came along in 1921 in the form of a complete shutdown of the plant. Through the kind offices of Professor Spofford '93, I then landed an instructorship in the Civil Engineering School at Purdue University. The next year I was advanced to assistant professor and taught one more year there. Then back to the American Bridge Company for a 13-year stay in the designing office in New York City. Four of those years were spent as assistant to the chief engineer, during which time I was active in developing structural steel welding and working on some of the large building jobs, such as the Chrysler, Empire State, and Radio City.

"Just when I felt that I was located in New York for good, the United States Steel Corporation selected me to be the engineer of the Railroad Research Bureau which they created in 1933 here in Pittsburgh. So the past five years have been spent here — working with high-tensile steels and their applications to lightweight railroad equipment. Strange as it may sound — my ignorance about railroad cars was one of the things which governed my selection for the position.

"Thus runs the tale. In between times, I have done quite a bit of technical writing and lecturing. The years have not changed me much in personal appearance beyond adding some weight and some gray hairs. I've not added the disguise of a mustache or joined as yet the baldhead candidates for the first row at the theater. You asked me if I ever see Ralph Ferry! Yes, quite often at the 1912 dinners. He and I are the only '12 men in this district. My roommate at the Institute, Harold Mabbott, II, arrived back in this country last September after a two-year tour at Honolulu. He is a major in the Coast Artillery Corps. In case he hasn't notified you of his address, it is Fort Belvoir, Va.

"Well, Dave, you can use the scissors on this letter to your heart's content. Throw it in the wastebasket, excerpt it, or do as you wish. After 26 years it was about time I let you have something for the class news. That's the first place I turn when The Review comes and only as we fellows write in will there be any reading for the others." A lot of other classmates tell us they turn first to the class news when The Review comes in — and all too often find little or nothing there. We owe a vote of thanks to Priest and Mabbott for their letters. Who'll be next?

John L. Bray, III, head of the department of metallurgy at Purdue University, was back East in the fall making a study of the use of comprehensive examinations at various institutions, and he paid a call on his old associates at M.I.T. He was

1912 Continued

very enthusiastic over the new building for his department at Purdue, which will give them much needed space and splendid facilities. Plans are already completed and construction is going on, so that next year Bray expects that they will be in their new quarters.

Attending the American Institute of Electrical Engineers winter conference in New York, late in January, James A. Cook, VI, telephoned your Assistant Secretary and organized a small reunion of his own at the Hotel Pennsylvania. On short notice, Cook managed to get R. J. Wiseman, VI, Harold H. Brackett, VI, and D. J. McGrath, I, to join him for an informal dinner party at the Hotel Pennsylvania on the evening of January 23. Cook is general manager of the Lynn Gas and Electric Company, Wiseman is chief engineer of the Okonite Company, and Brackett is in charge of an engineering division of the New Jersey Bell Telephone Company. The lone Course I man, who has long since abandoned (or been abandoned by) the civil engineering business, was somewhat overawed by all the technical electrical experts with whom he was surrounded, so he tried tactfully to steer the table conversation into such general topics as what's wrong with the young college graduate of today, what's wrong with business . . . and what's wrong with the New Deal. On the latter subject he was told plenty. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. MCGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42d Street, New York, N.Y.

1914

Now that reunion plans are taking shape rapidly and are being covered by class letters and by the *Fourteen Pointer*, it is unnecessary to devote further space in these notes urging your attendance. If, however, you have not received any reunion literature, be sure to write your Class Secretary so that our mailing list may be corrected. And, by the way, did you send in your two dollars?

Thorn Dickinson, who has traveled around the country a bit in recent years, is now temporarily located in Los Angeles investigating the rapid-transit end of a comprehensive traffic survey being conducted by the "Citizens Transportation Survey Committee." Stone and Webster, with whom Thorn had been connected before serving as treasurer of the Calhoun School in Alabama, are heading up the work. Thorn writes that although he has relinquished the Calhoun treasurership, he still remains as a trustee.

Skip Dawson, who for many years has been associated with the paper industry in Pittsfield, Mass., has changed from the actual paper production end to that of manufacturing paper-mill equipment, and he is now associated with the E. D. Jones and Sons Company, manufacturers of both beaters and Jordans. — Buck Dorrance and George Whitwell were both in Cambridge for the January meeting of the Technology Corporation, and we had an opportunity to discuss reunion plans as

well. — Reports from Miami Beach tell that Porter Adams is doing well under the warm Florida sun and is frequently seen out in his speedy La Gonda car.

Henry R. Aldrich, who is the editor of the publications of the Geological Society of America, was active at the society's convention held at the Waldorf-Astoria in New York at the end of December. Aldrich was on the program committee. — Another '14 geologist, L. W. Currier, was in Boston in December conferring with the Massachusetts Public Works Department regarding plans for a geological survey covering geologic-mapping and road-building projects. — As has been the case in recent years, Herman Affel took an active part in the annual convention of the American Institute of Electrical Engineers held in New York at the end of January. Course VI men will be pleased to know that the A.I.E.E.'s highest award, the Edison Medal, was this year conferred on Professor D. C. Jackson. — Friends of Halford Ambler will be sorry to learn that his only son, Hal, Jr., has been very ill for the past three months and is still in a serious condition.

There has been formed a new motor organization, known as the Veteran Motor Car Club of America. The purpose of the club is to preserve old cars and literature with the hope that a museum and library of historical and educational value may be established ultimately. Our own Dean Fales has been honored as the first president of this new organization. It is understood that Johnny Leathers is still operating the famous car that he brought to the 20th reunion, in order that it may qualify for the museum in due course. Leathers still insists that this is one of the oldest cars still in operation on the highways of Massachusetts. Personally, we think he is right. — H. B. RICHMOND, *Secretary*, General Radio Company, 30 State Street, Cambridge, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York, N.Y.

1915

Bert Adams may be able to pick rabbits and other things from top hats or from up his sleeves but that feat of legerdemain will not produce class notes. When wives and children of our classmates ask me about our column it shows, gratifyingly, that the absence of news is at least noticed. "Help Azel" — write! Christmas cards from many classmates gave me a warm feeling for our old friendships. My thanks to all who remembered me so kindly. Although it's now a bit late, I do hope you all enjoyed happy holidays with your families and have entered into a successful and cheerful 1939.

It is time to start to think about our 25th reunion in 1940 — only a year away. Shortly you will begin getting publicity notices from the committee. Your suggestions for the best way to make this a huge success will be welcomed.

Time marches on, as well we must know when we scan the following list of children of 1915 now at the Institute. As this list grows there may come a time

when we will have to have a class reception for these youngsters. I don't know about that, though, for the reputation the Class has established may make it more advisable to have these youngsters acquire their acquaintance with daddy's Class by simply meeting the dignified, conservative, well-behaved Class Secretary. That's me! The daddies are here shown in parentheses. *Class of 1942*: Paul S. Crandall, I (James S.); Francis B. Herlihy, XV (Frank J.); John W. Lacy, XV (Clive); John E. Loveland, X (E. M.); George R. Urquhart, Jr., X (G. R.); Sumner C. Willis, XIII-C (S. L.). *Class of 1941*: Robert E. Bailey, VIII (Lawrence H.); Charles L. Hall, Jr., I (Charles L.); Cutler Jones, XV (Fiske R.). *Class of 1940*: Edward J. Kingsbury, Jr., XV (Edward J.). *Class of 1939*: Robert C. Casselman, XV (E. J.); Charles E. MacKinnon, XIV (J. H.); Robert A. Schmucler, Jr., XIX (R. A.). Donal K. Holway, William's son, is doing special work in Course VI, having been graduated in 1937 from the University of Chicago. There must be many other 1915 children in colleges elsewhere, especially daughters. Perhaps sometime we can get family statistics for the Class. Last summer I met Ted Spear with his two daughters, one of whom was leaving in the fall for prep school. The years have treated Ted well.

The ravages of time's advance have not slowed down our men completely. For the old athletic proclivities still remain in Frank Murphy, Jac Sindler, Frank Foster, and Pirate George Rooney. They bowl every week in an engineers' league (a slight misnomer for their type) in Boston. Because of the intense competition and bitter rivalry I have been called in occasionally to keep an honest score for them. From their postgame celebrations I can understand why the game is called bottle pins.

Since 1934 the University of Southern California at Los Angeles has been offering in its evening division a series of 12 lectures on rubber technology given by R. B. Stringfield. Ray has been in the rubber industry since 1920. — Jim Tobey has been appointed lecturer of public health law at the Harvard School of Public Health for the current academic year. Our congratulations and best wishes to these classmates.

From Loca W. Steele, 2814 Glenwood Avenue, Hollywood, Calif., I received a notice postmarked November 12, stating that he would attend the 1915 class party to be held at the Boston Statler the preceding June 6. A trifle late, but maybe it had been raining on the sunny West Coast or Steele had just cleaned out his desk. At any rate, it gives one a laugh. — Lloyd Chellman, recently transferred from Boston, wrote from 33 East 22d Street, New York City: ". . . Am still with the government and was transferred here last November as senior engineer in charge of all work in Massachusetts for the Public Works Administration. My wife came over in July and we have an apartment at the foregoing address. The 15-year-old daughter was in camp all

Plan to attend Alumni Day at M.I.T. on June 5

1915 Continued

summer but is now with us and will remain. The 18-year-old boy is paying us a short visit but leaves for Bowdoin next week, where he expects to study how not to be an engineer. My office is at 2 Lafayette Street, Room 1714, directly opposite the United States Court House and near the Brooklyn Bridge or Chambers Street subway stations. Would be delighted to see you at any time, either there or in our spacious two and a half room apartment. It is like living in a doll's house but is restful to the conscience, as I don't ever have to feel that I should be out cutting the grass or shoveling snow out of the driveway. . . . I hope you New York boys will welcome Lloyd and make him feel at home.

The first to answer my plea, "Help Azel," was Norman Doane, who, writing on the letterhead of the Permutit Company at Charlotte, N.C., gives us the following interesting and enjoyable letter: "I am not writing you for lack of something else to do nor even because of anything of special interest to report. I always enjoy getting The Review and invariably turn first of all to the 1915 class news. After reading same there is the guilty feeling, then the good resolution, then the old alibi of nothing worth writing about. The entire absence of any class tidbits in the December Review finally has gotten me past the resolution and alibi stages and into action. It's like a soldier going into action without ammunition, but there he goes anyhow."

"As an introduction I might record that I'm about to complete my 15th year with the Permutit Company, selling water-treating equipment. The last seven of these years have been in the Carolinas. Being so far away from the center of M.I.T. activities and from the sphere of influence, I naturally do not see many of my associates of nearly 25 years ago. However, when one is encountered it is just that much more of a thrill. I see Lucius Bigelow occasionally. You of course know he is long since a Ph.D. He is doing a swell job, from all accounts, trying to teach the 'Blue Devils' at Durham, N.C., a little chemistry along with their football. — The Knitting Arts Exhibition at Philadelphia last April provided the setting for a most unexpected and enjoyable visit with Alton Cook. He is with the Arkansas Chemical Company with headquarters at the home office in New Jersey. Modesty and perhaps trade secrets and company policy prevented him from elaborating on the details of his job and the nature of his chemical researching."

"The T.A.P.P.I. (Technical Association of the Paper and Pulp Industry) convention in Savannah, Ga., a year ago brought me up with Allen Abrams, a former roommate, who has been making his mark (watermark, perhaps we should say) in the paper industry. Here is one fellow who seemed predestined for the big cities with their symphonies, concerts, and formal affairs. But paper is not produced in the cities, so Allen's home address is 'somewhere in the Wisconsin timber belt,' when he's not on a business

or convention trip to the big centers of industrial and social activity. — Frank Hall of Port Arthur, Texas, and Yonkers, N.Y. (chief chemist of the Texas Company), was giving the Southern Textile Exhibition at Greenville, S.C., the once over, a couple of years ago, when I had the good fortune literally to bump into him. Come again, Frank, and I'll keep an eye peeled for you! — Albert Sampson of the Calco Chemical Company is another of the Course V boys whom I have had the good fortune to see since I changed my stamping ground to the border of the Deep South. The occasion was a national meeting of the Textile Chemists and Colorists Association at Chattanooga, Tenn., two years ago. Same old Al, although he is holding down a very responsible and exacting job."

"So much for the few classmates I've encountered in the past few years. If they are fair samples, the graduates of 1915 are advancing not only in years but also into positions of prominence and leadership in their respective fields. Many have gotten past the state where they have to budget their expenses so carefully and now have to budget their time. At any rate I hope all who read this (if it gets printed) will give serious thought and start convincing themselves now that they will make every effort to attend the 25-year reunion. Twenty-five years must mean something even to the busiest and most overworked member of the Class, and probably many of us think we are that particular one. I for one am going to try my best to make it, although competition is already looming up in the form of a convention in June, 1940, at Yellowstone Park, which I would ordinarily feel duty bound to attend. . . ." Now if Norman can get Lucius Bigelow to write us, he will have done a great job. Thank you very much, Norman, both for your letter and for stirring up the boys on 1940."

All hail the new honors to Speed Swift: "This is to take the place of a New Year's greeting card to you and also to inform you that I was today [January 4] sworn in as a member of the legislature for the state of New Hampshire. There are 425 of us in the House only; besides there are senators, councillors, and so on. We are in session four days a week, from Tuesday to Friday, so, you see, barring some unusual session or special committee work, I still live in hopes of spending a week-end in Boston to show those movies of you folks playing with our goat at Windy Acres and perhaps some new and more gorgeous 'HELP AZELS.' Keep it up, Herb, you may yet give us the glory of having a governor in our Class."

This is a good set of notes, but if you want more like it, be wise and "Help Azel." — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline, Mass.

1916

The following bit of news comes from Joe Barker down at Columbia University and brings us up to date with his activities. "Although we had plenty of excitement

when the hurricane carried away our summer home at Saltaire on Fire Island, we fortunately weren't there, as we were on our way to enter my daughter as a freshman at Swarthmore. In our absence, however, the waves did a thorough job, leaving not a stick standing. As most of the Class know, after nine years' service in the Coast Artillery of the Regular Army, I resigned in 1925 to go on the staff of the Electrical Engineering Department at Tech. Then I went to Lehigh University as head of the electrical engineering department there and in 1930 came to Columbia as dean of the faculty of engineering, where I am still holding down the job, with the mass of administrative work in a great university. Shortly after my wife's death a year ago they hauled me off to the hospital for a critical internal overhaul, but I fooled them and have now completely recovered. Am looking forward to our 25th."

While in Providence recently, I learned that Hovey Freeman was a heavy sufferer during the hurricane. I understand that Hovey lost both his speedboat and his yawl, also that the pier at his summer home and most of his small boats were completely demolished. Perhaps we can prevail on Hovey to have one of his boats on hand at our 25th reunion. — Santa Claussen breaks into print again: On Friday, January 20, he exhibited one of the outstanding schipperke dogs in the country. As owner and handler, Santa walked away with a blue ribbon. Dave Patten suggested this item be captioned "M.I.T. goes to the dogs."

On December 30 the Boston *Evening Transcript* reported the sudden death of Charles M. Osborn, 3d, IV, nongraduate. Mr. Osborn was associated with Maginnis and Walsh, Boston architects, and was nationally known for his work in Gothic church interiors. — The Boston *Evening Transcript* carried also notice of the death of George H. Stickney, II, on January 1 at his home in Beverly, Mass., following a long illness. Mr. Stickney was affiliated for 22 years with United Shoe. — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Coleman Brothers Corporation, 245 State Street, Boston, Mass.

1917

Joseph Gargan dropped in on a flying trip to locate industrial companies dealing with the government. He travels over the United States as a member of the division of public contracts of the Department of Labor, part of the organization supervising the administration of the Walsh-Healey Act. He had seen Mac in Rochester in September but did not say whether he found him obeying the Walsh-Healey provision. All contracts with the government over \$10,000 are affected by the act. Joe is expected to use diplomatic ability to the full, as his division desires friendly as well as effective relations with contractors.

A son, Frederick Clair, was born to Dr. and Mrs. Clair E. Turner on October 3. Clair is a professor in the Institute's

1917 Continued

Department of Biology and Public Health. — From our Chicago correspondent comes word that Rad Stevens, formerly superintendent of production control of the Elgin National Watch Company, has resigned to become associated with Lee W. Duer in the management of the Elgin Manufacturing Company and to become its production manager and vice-president. The company, established in 1840, is now engaged in the manufacture of automatic filling machines for round and square cans and glassware. It is reported that the present maximum capacity of Elgin fillers is 300 units per minute. There is no doubt that under Rad's hand there will be a material increase in this figure.

A much traveled press report from Seattle has reached the secretarial desk. In headlines of no mean size it appears that "Tourtellotte Gets Brilliant Yule Surprise." The press continues: "Neal E. Tourtellotte, prominent Seattle business man, likes to get surprise Christmas gifts. Well, sir, he *was* surprised when the presents were passed around at his home on Christmas Eve. Bathrobe? No. Pajamas? No. Socks and ties? Wrong again. Saturday a big box came to the Tourtellotte home. Tourtellotte thought he heard scratching inside, but he couldn't even come close in the annual ritual of guessing. The mystery deepened when Mrs. Tourtellotte asked him to come outside and open the container. He wasn't in the habit of opening his gifts in the yard, but he was willing to oblige. Outside with wife and friends gathered in a circle the lid was lifted and out hopped a peacock and a peahen. Neighbors have suggested names, including Pride and Prejudice, Surprise and Bewilderment, and Dismay and Despair. The choice will be made as soon as Tourtellotte recovers from the shock of not getting an orthodox present." — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

1918

I am very sorry there were no notes from either your Secretary or your President in the last issue, but the holiday season interfered with both of us. I hope that such a thing will not happen again. But I have to confess that the members of the Class must keep me posted with material if they want notes regularly.

While in Boston, during the holidays, I contacted Ray Miller and saw the movies that were taken at the reunion last June. Ray did a fine job on the movie and succeeded in getting close-ups of almost everyone present. We went over the reel two or three times and between us we have tagged each individual with his name. Ray is now going to cut the film and insert titles so that it will be complete. Members of the Class must remember that this year the film has been done in color; ten years ago our reel was black and white; and I suppose that at either the 25th or the 30th we will have talkies of ourselves.

While visiting Ray's family I gleaned some news which I think will make some members of the Class smile: Believe it or not, Don Goss is president of the Parent-Teachers Association down in Swampscott. Wouldn't we like to be a fly on the wall and see him presiding! I think that all of us must try to get to the meeting of that organization in April, when Don introduces our honorable President, Frederick Alexander Magoun, as the speaker of the evening. Must confess that I have forgotten the title of the speech. The following note was sent to me from C. E. Locke '96: "The December issue of the New Hampshire *Troubadour*, which is published by the State Planning Board and Development Commission, carries an article by F. Alexander Magoun entitled 'Happy Valley Gets a Cabin.' This story is about the building of Professor Magoun's new home there and is illustrated with views of the house." Better furnish us with a copy of this magazine, Maggie, for our archives.

Bemis Industries, Inc., has announced its formation as the Modular Service Association, of which Myron W. Adams is executive secretary. This association offers a coöperative service with the building industry for the correlation of dimensions of buildings, materials, and equipment. The offices are now located at 110 Arlington Street, Boston.

Recently I dropped in on Pete Sanger and his family in Old Greenwich. His older daughter finished Greenwich High School in January, graduating in the mid-year class. — GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1921

Remember a good-looking young fellow who came down from Lowell to enter the Institute with us and get his degree in Course I while running with, or just plain running, the varsity track team, the cross-country team, the Civil Engineering Society, the Aero Club, and even the chess team? Meet Lieutenant Elliott B. Roberts, hydrographic and geodetic engineer of the United States Coast and Geodetic Survey, whose picture in the Boston *Globe* of December 22 closely resembles the senior portfolio likeness in "Technique," now adorned with just the proper weight to lend dignity and distinction.

Speaking of Bob, the *Globe* of that date says: "Lieut. Roberts, who for three years has been officer in charge of the Boston field station, U.S. Coast and Geodetic Survey, can look forward to a taste of life on horseback when he is detached tomorrow from the local station for sea duty. He will be one of a group that will leave the West Coast next Spring aboard one of the bureau's vessels to spend six or seven months in the lonely Aleutian Islands region in the North Pacific, making chart surveys of that area. Part of the work calls for leaving ship for horseback. The charting of this area was started by the Government in 1934 and is expected to take from 15 to 20 years. The only charts available

for North Pacific waters have been the inaccurate old Russian charts dating back to the days of sailing ships, supplemented from time to time by what information an occasional merchant or navy vessel navigating those waters has supplied. Accompanied by his wife and family, Lieut. Roberts will depart for the West Coast December 30 and will establish a home for his family at Seattle before he departs for the north." Best wishes, Bob.

Robert E. Beard, X, who has been manager of the Rocky Mountain division refineries of the Standard Oil Company of Indiana, with headquarters at Casper, Wyo., assumed new duties on January 1 as the head of that company's refinery located at Sugar Creek, Mo. Bob started his career with Standard Oil at the Whiting, Ind., refinery shortly after leaving Technology. In 1922, he was transferred to the Casper refinery where he has advanced through various positions to become an operating executive.

Paul H. Rutherford, VI-A, chief engineer of the Delco Products division of General Motors Corporation, presented a paper entitled "The Rating and Application of Motors for Refrigeration and Air Conditioning" on January 25 at the symposium on "Rating of Electrical Machinery and Apparatus" at the winter convention of the American Institute of Electrical Engineers in New York. Ray St. Laurent dropped in at the sessions.

William L. Knoepke, VI, is treasurer of the Ward Motor Vehicle Company of Mount Vernon, N.Y., and also resides in that city. Bill has promised to arrange a get-together in the near future and tell us more about his work and his family which includes two fine daughters. Speaking of Tech Show saxophone sextets, do you still toot that bazooka, Bill?

G. Everett Farmer, VI, who divides his allegiance between 1921 and Clate Grover's flock, writes from 25 Asbury Drive, Chattanooga, Tenn., that he is a communication engineer with the T.V.A., concerned chiefly with the design and installation of carrier-current equipment. Gef has been in California for many years and was connected with the Colorado River Aqueduct project on which he designed the telephone equipment for pumping plants, as well as the lighting for the entire project. In addition, he designed and prepared specifications for all the manual telephone equipment used by the Bureau of Reclamation for the Boulder Dam powerhouse.

Ex-healers of the *Tech* of the vintage of 1917 (when the old rag was housed in Stone and Webster's abandoned construction hut on the site of what is now the magnificent new 77 Massachusetts Avenue) will be glad to know that an address has been received for George R. Steininger, I. He can be reached at 5401 Cornell Avenue, Chicago, Ill., whither we have dispatched a note asking Russ for his news since the days of arguing with Heintzie, the printer!

Other new addresses which have been received this month include those of Roger Clapp, I, 8 Ringgold Street, Boston;

Plan to attend Alumni Day at M.I.T. on June 5

1921 Continued

Hunter E. Gardner, XV, 1313 Alston Avenue, Fort Worth, Texas; Professor Dugald C. Jackson, Jr., VI-A, 427 North Kenilworth Avenue, Oak Park, Ill.; Donald D. James, XV, Donald D. James, Inc., 714 Littlefield Building, Austin, Texas; Leo Mann, V, Cumberland Chemical Company, 112 Point Street, Providence, R.I.; Hazen C. Pratt, II, Apartment 155, Curtis Hotel, Minneapolis, Minn.; Professor John T. Rule, XV, Room 2-361, M.I.T., Cambridge.

We need news urgently; March winds, come blow it in! Will you help by supplying the script and a stamped envelope addressed to either address below?—RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, 10 University Avenue, Chatham, N.J.

1922

On a recent Saturday evening, imagine our surprise to hear coming over the radio the soothing voice of Ray Burrus. We paid close attention because we had not realized before that Ray had radio ambition. We discovered that he had been chosen from the guests in the Hotel McAlpin lobby in New York to answer a few questions about smoking tobacco on the program of one of the leading tobacco companies. The next thing we know Ray's name will be in bright lights on Broadway.

In September, Bill Freeman, I, notified Yard Chittick that he had moved back to his home town of Philadelphia from Boston to open a sales office for the Mutual Boiler Insurance Company of Boston. Bill maintains that his long experience with the United Gas Improvement Company and New England Power Association makes it possible for him to tell the difference between a synchronous condenser and a frequency changer which makes the insuring of such machines second nature to him. He goes on to say that he likes to look at the name plate on the machine first.

Ken Merriam keeps the aeronautical engineering department of which he is head at Worcester Polytechnic well in the forefront of the news. Professor Merriam and Worcester Polytechnic are planning extensive coöperation with the government in the proposed national air defense program.

President Horn has transferred his *locus operandi* from New Jersey to Ohio where he will continue to get the big companies to sign on the dotted line for National Cash Register equipment. His headquarters are temporarily in Akron, Ohio, but he is directly associated with the Cleveland district office. Heinie promises to see us here on the Coast frequently as he commutes back and forth from Ohio to his boat moored off the Jersey coast.

The Class might almost be called "vagrant" judging from the number of address changes which come through to the Secretary from the Alumni Office. Those of us who are in the know recognize that these changes of address are all

steps up the ladder to fame and fortune; so the more the better. The boys in Boston have suggested that these address changes would be of considerable interest to the Class as a whole. Consequently, we are going to try to give them as they come through. We have the following recent moves to report this month: Alfred Wolf, VIII, from Philadelphia to the Geophysical Research Corporation, Tulsa, Okla.; A. Martin Feldstein, X, from New York City to 87 Homestead Avenue, Albany, N.Y.; LaMonte Griswold, II, from Rochester to 63 Columbus Street, Newton Highlands, Mass.; Paul S. O'Brien, III, from New York City to 407 Herndon Avenue, Shreveport, La., care of Mr. S. S. Handley; Ross E. Van Gieson, II, from New York City to 1032 North Dearborn Street, Chicago, Ill.; Frank C. Vogel, X, from Providence, R.I., to 1 Walnut Terrace, Newtonville, Mass.; Myer L. Alpert, X, from Brookline, Mass., to 21 Lancaster Road, Newton, Mass.; John O. Bower, XII, from Buenos Aires, Argentina, to Antilles Petroleum Company, Post Office Box 31, Fernando, Trinidad, British West Indies; Charles E. Brokaw, XV, from Kansas City, Mo., to 1361 Cherry Street, Denver, Colo.; Paul J. Choquette, X, from Providence, R.I., to West Main Street, Dudley, Mass.—CLAYTON D. GROVER, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York City, N.Y. C. YARDLEY CHITTICK, *Assistant Secretary*, 77 Franklin Street, Boston, Mass.

1923

In the Chicago *American* of December 15 we read of the engagement of Miss Gertrude Madeline Busch, daughter of the late Mr. and Mrs. Emanuel J. Busch, to Henri Pell Junod, son of Madame Louis Henri Junod of New York City and the late Louis Henri Junod, former consul general of Switzerland. Miss Busch attended the Immaculata Academy and the University of Texas. Mr. Junod prepared at Salisbury School in Connecticut for the M.I.T. and during the War served with the Royal Flying Corps. He is a member of the University Club.

Another item is the announcement of the marriage of Thomas Hutcheson Boyd and Lillian Gladys Carlson on Tuesday, December 27, at Philadelphia. Since the first of February the couple have been at home at 317 Lafayette Avenue, Passaic, N.J. Boyd is with the Manhattan Rubber Manufacturing division of Raybestos-Manhattan, Inc.

The following news is from the Boston *Evening Transcript* of December 20: "Irvin Gerofski, management engineer, associated with McKinsey Wellington Company of Boston, died at the Beth Israel Hospital today after a week's illness. Mr. Gerofski, born in Jamaica Plain, attended Boston Latin School and in 1923 was graduated from the Massachusetts Institute of Technology. He was a director of the Blackstone Plush Mills, Inc., of Clinton, and a member of the National Association of Cost Accountants. Surviving are his widow, a seven

months old son, his mother, a brother and a sister. Mr. Gerofski's home was in Brookline."

Mrs. McMeans reports to the Alumni Office the death last May of her husband, Wayne Fox McMeans, at Sandusky, Mich. McMeans was a member of the staff of the *Tech* as an undergraduate and afterwards was in newspaper work in Michigan. — Professor Locke '96 had a letter recently from E. B. Ledesma who reports that he and his wife are leaving Manila on March 26 for a two months' visit in and around Boston. As an official of the Philippine Long Distance Telephone Company, one of his objectives is to see the biggest developments in telephony. He hopes to be on hand for Alumni Day in June. — HORATIO L. BOND, *Secretary*, 457 Washington Street, Braintree, Mass. JAMES A. PENNYPACKER, *Assistant Secretary*, 96 Monroe Road, Quincy, Mass.

1924

While at this January writing some reunion plans are still in the making, many important details have been worked out. Saturday and Sunday, June 3 and 4, will be the dates, the location will be near Boston to allow for attendance at Alumni Day on the following Monday, and committees are actively at work on further refinements in the interest of a bang-up good program. Chick Kane, who is publicity chairman for all Alumni Day activities, will also promote the class reunion with his customary *Voo Doo* vigor and originality. George Knight, whose memory for names and faces dates back to his days as general manager of "Technique," is in charge of arrangements for the club — meals, lodging, and other appurtenances — and will have a committee which will assure the maximum of fun and fellowship. Gordon Joyce will be indoor and outdoor athletic director, and promises to have everything from horseshoes to dominoes. Bill Correale, general chairman, also has an active committee in New York and elsewhere to spread the good news of the reunion far and wide. And President Bill, in Los Angeles, is keeping on the pressure and saying a prayer that some emergency or other will call for his presence in Boston on the first week-end in June.

From Paul Cardinal we learn that northern Jersey men recently held a meeting at which the following were present: Blaisdell, Fancher, Hawkins, Lassiter, Southgate, Stevenson, Straight, and Coleman. Here's hoping to see them all at the reunion. — FRANCIS A. BARRETT, *General Secretary*, 50 Oliver Street, Boston, Mass.

1925

Bulletin to all members of 1925: If you move, or wish your mail sent to a new address, communicate with the Alumni Office or your Class Secretary at once; do not wait until you pay your dues or write in for some other reason. We want to keep our address files up to date.

Those of you who read "Meet the Co-founder" in a recent issue of the *Saturday Evening Post*, must have been interested

1925 Continued

to know that A. A. Lauria, II, is working for Sears, Roebuck and Company. He had charge of their superservice station on Brookline Avenue, Boston, when it was opened in the summer of 1937. In January, 1938, he was transferred to Chicago as assistant buyer on batteries, oil, grease, spark plugs, gasoline, and antifreeze. (What! no radiator cement?) He is also on sales promotion for service stations. He is managing to keep busy. Congratulations on the step-up! We are sure that it was merited.

Gus Marsh, III, dropped into Doc Foster's office the other day and reported among other things that all was going well with his rubber products business. — Professor Locke '96 showed us a letter from Count Blonsky, III, the other day. When operations stopped at the mine up in Idaho at the beginning of the winter, he packed out his personal possessions to the nearest railroad, and went to San Francisco to look around for another opening. There he and his wife are spending the winter.

A note is at hand from Obie Denison '11, accompanying a clipping from the Worcester Telegram. It says: "Mr. and Mrs. Frank W. Bemis of New Rochelle, N.Y., announce the birth Saturday, December 24, of a son. Mr. Bemis formerly lived in the Hotel Bancroft (Worcester) while sales manager of the American Steel and Wire Co. Mrs. Bemis was formerly Agnes Fitzgerald of Omaha, Nebraska." Congratulations, Frank! A grand Christmas present! Denison writes: "I first met Frank out in Butte, Mont., during one of my western trips as alumni secretary soon after you and he were graduated. When I returned here to Worcester in 1935 I found he was here, and he was a most loyal member of the Worcester County Alumni Association until his departure for the Cleveland office of the American Steel and Wire Company." — HOLLIS F. WARE, *General Secretary*, 17 Green Road, Medford, Mass. F. LEROY FOSTER, *Assistant Secretary*, Room 6-202, M.I.T., Cambridge, Mass.

1926

Our miners have been active in recent months, or at least their Boswell, Professor Locke '96, has been Johnny on the spot. He reports that Cyril S. Smith of Cheshire, Conn., has assigned to the American Brass Company his new patent on the production of a copper-cobalt-zinc alloy, and has assigned to the Anaconda Copper Mining Company his new patent on a method of improving surface casting of copper and its alloys. — Art Johnson has made a short move from Idaho Springs, which curiously enough is in Colorado, to Cue, which likewise curiously is in Australia. In the terse and laconic city of Cue he will be associated with the Big Bell Mine. The mine over in Colorado which commanded his interest was feminine and its name was Alice.

The engagement of George P. Rupert, Jr., to Miss Marion Ehlers of Minneapolis was announced the day before Christmas. — A son, Frederick Clair, was born

on October 3 to Dr. and Mrs. Clair E. Turner. As Naomi C. Turner, Mrs. Turner was a member of our Class. — We recently read an article by Leo Teplov entitled "Patent Interference" in the Allis-Chalmers *Electrical Review*. Teplov is a patent attorney with that firm. — J. RHYNE KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

1927

Jim Pilkington is the office supervisor of the home office of the Travelers Insurance Company at Hartford, Conn. Jim has been with Travelers ever since graduation. — The records of the patent office show the granting of a patent to Norbert Wiener, Professor of Mathematics at the Institute, and Yuk Wing Lee. The patent covers a very complex electrical network system and is assigned to the American Telephone and Telegraph Company. Lee took up graduate work and was awarded his doctorate in electrical engineering in 1930. — Frank Staples was recently appointed plant manager of the American Molasses Company and subsidiaries. He had been in charge of the design of the Sucrest Sugar Refinery, first "pocket sugar refinery" in the States. — Ham Moineau, the wire-basket magnate, is still in Marlboro where he is treasurer of the Marlboro Wire Goods Company.

A very interesting letter which your Secretary received several months ago at the time of his move from Waukegan to New York has just been relocated. It is from Sam Kaswell (Sam Koslofsky but changed to Kaswell shortly after graduation). A few months after taking his first job, with the New York Consolidated Gas Company, Sam went with L. S. Sonneborn Sons, manufacturing chemists, where he spent five years in their textile chemical products division in charge of production and analytical work. Having the urge to be his own boss, he went into business alone under the name of Fabric Chemicals Corporation, where he tried to be sales, production, and financial departments all in one. Three years of this sort of struggling "drawing practically nothing but my breath in the line of compensation and hoping that things would soon break" brought "a beautiful case of pneumonia, complicated by pleurisy and emphysema." The loss of a few ribs, five months in the hospital, and four months in Florida put Sam on his feet again. He married Miss Alice Gladstone of Brooklyn in March, 1937. Good fortune has now replaced misfortune in Sam's life as he reports a young son, Joel Robert, and a continuation of his company, now grown out of many of the disappointments that are a part of a new company.

A rather general rumor had it a while ago that our good political friend and President, Jim Lyles, had turned to bricklaying because of misfortune in the banking fraternity. Fortunately this was but a rumor brought on by Jim's six months' endeavor and final success in designing and building an outdoor fireplace at his home in Bronxville. — RAYMOND F. HIBBERT, *General Secretary*,

Care of Johns-Manville Corporation, 22 East 40th Street, New York, N.Y. DWIGHT C. ARNOLD, *Assistant Secretary*, Arnold-Copeland Company, Inc., 222 Summer Street, Boston, Mass.

1929

Information coming in from Brig Allen and Fish Hills indicates that our 10th-year reunion plans are shaping up and we can look for early announcements covering time and place and program. Tentatively, make your plans for a vacation trip early in June, just as your Secretary is doing, and join in the reunion get-together when you get there. Let us all plan ahead for this occasion. No doubt some of us have never been back to the Institute since graduation. There will be lots new to see and many old friends to meet. Those renewed friendships will grow more valuable to us as the years roll on. The only way to meet those old friends as a group at this time is to get back for the 10th-year reunion. Let's boost this event, for it is the first real milestone in our careers.

Obie Denison, Class Secretary of 1911, wrote a note to us recently reporting on Len Peskin's activities in Worcester, Mass., where Obie is connected with the Chamber of Commerce. The clippings he inclosed indicated that Len was to deliver a speech on "Causes and Cures of the Vibration Hum which Emanates from Power Transmission Lines" at Worcester Polytechnic Institute. Len, who is now Dr. Peskin, is associated with American Steel and Wire Company in Worcester as research mechanical engineer on problems of design, stress analysis, and vibrations. His speech was before the Worcester section of the American Institute of Electrical Engineers. You will all remember Obie Denison who was so active around the Institute when we were there and I'm sure you will join me in thanking Obie for his kindness in sending us this clipping of Len Peskin's activities.

From Charlie Locke's ['96] files we have the information that George Walker, Jr., III, was back home in Center Point, Texas, in November and was hoping to remain there over Christmas. In the earlier part of last year he spent six months in British Columbia hydraulicking for placer gold, continuing as long as the water lasted, and he anticipated returning this spring when the season opens, unless something else turned up. This has been a new line for him, as all of his previous mining experience has been in hard-rock mining.

A clipping from the *Engineering News-Record* covers a meeting of the American Society of Civil Engineers in Rochester in which our Bob Philippe, I, of Pittsburgh delivered a paper covering methods of soil control in the earth dams of Muskingum Conservancy District. Bob has been in charge of soils laboratory, United States Engineer Office, Zanesville, Ohio, which connection should qualify him very well to speak on his subject, for there have been several earth dams constructed in that area in the last few years.

Plan to attend Alumni Day at M.I.T. on June 5

1929 Continued

A clipping from the Boston newspapers announces the engagement of Miss Florence Dudley of Brookline, Mass., to Lincoln Fitts, XV, also of that town. Fitts was a member of our Class through our sophomore year and we extend our congratulations to him on this occasion.

There follows some more Course XV news, the first we have had for a long time; many thanks, Elmer. It would be fine if we heard oftener from the various Course Secretaries. — EARL W. GLEN, *General Secretary*, Box 178, Fairlawn, Ohio.

COURSE XV

This blast is no doubt a surprise if not an outright shock. To start the ball arolling, there's not much '29 dirt that I can give you, for, while there are quite a few Tech men here in Louisville, I am the only '29 man. Whatever advantages Louisville possesses, it is somewhat off the so-called beaten path, and about the only one from our Class whom I've seen since coming here in 1935 is Beans Nivling, and that was almost three years ago. Beans then was with the Lewis-Shepard Sales Corporation of Watertown, Mass., and was here in Louisville about some local representation for his firm. So far as I know he is still with the same firm but he sure has been neglectful of both his local dealer and the rest of us Louisvillians.

Sears Hallett I saw once or twice just before I came down here. He then was buying for the Sherman Paper Products Corporation of Newton, Mass., and, as well as I could judge from my position on the other side of the table, he was doing a right good job at it. So far as I know he is still with them. — Kononoff, from last reports, is in Florida but what doing I don't know. He would get a break like that. — The last word I have on Bill Lerner is that he is with the Standard Naphthalene Products Company at South Kearny, N.J., but again I don't know what he is up to. — Charlie Nord I saw once or twice in New York City shortly after graduation. He then was with the New York Telephone Company but since then I understand he has gone West and is with the Nord-Buffum Pearl Burton Company. What's happened since and where and why, I can't say, but maybe Charlie will come one of these days.

Frank Pierson was at last reports doing big things for the Standard Gas Equipment Corporation at Jersey City, N.J. — Gordon Rogers I have heard from occasionally, and I'm glad to say that he seems to be hitting on all six. Gordon is with the Union Oil Company of California on the West Coast, in, I believe, the construction and maintenance department. He is married and the very proud father of two fine-looking children. Good progress for the first ten years out! — Ray Underwood, I hear, is doing big things in a legal way for a Washington, D.C., firm of lawyers — Spear, Donaldson and Hall. However, he has been mighty quiet about said doings, so I can't give you any details. Perhaps he will, ere long, supply them himself.

As for myself, I spent the first five years after graduation with the Electric Motor Company of Springfield, Mass., as sales engineer. With this company I got some good experience, both engineering and selling, but working a rather limited field, it offered a rather limited future. So in early 1935 I left to take a position with a Boston firm of industrial engineers. This work proved to be anything but to my liking, so when after only a few months on this job I received an offer to go with the Mengel Company of Louisville, I accepted it. And that is where I've been since, excepting the usual vacations here and there but mostly in the big town of Boston. My work here has been most interesting although rather difficult for me, for it has been mostly of an engineering nature. It has called many times for more of mechanical engineering and electrical engineering than I had to give it, but by working overtime that which Messrs. Miller '86, T. T. Haven, Fuller '92, Hudson '07, and so on, had exposed me to, I've managed to hang on. At the present time I am plant engineer at the body division of the company, the body part of the name being somewhat of a misnomer and hangover from the days when the division was devoted altogether to the making of wooden bodies and body parts for the automotive industry. That business, as you know, has "gone with the winds" with the advent of steel bodies. Most of our output now is furniture of the novelty kind — tables of all kinds, chairs, bookcases, and so on. We employ about 1,100 people altogether, of which about 75 are in the plant engineering department. Our work begins, you might say, with a 2,000-kilowatt power plant, runs through the construction, maintenance, and repair of buildings and machinery, down to such piddling details as keeping our overworked stenographers in the front office cool in the summertime, warm in the wintertime, and otherwise contented with their lot. All in all most interesting work, although very much work.

Speaking of my coming to Louisville, you know it is a funny thing to me that folks hereabouts didn't, after a while, brand me a jinx and buy me a one-way ticket somewhere, anywhere but Louisville. The first summer I was here was uneventful, but the first winter (1935-1936) was the coldest this town had had for over 30 years. Then followed the warmest or, much more accurately, the hottest summer it had had for over 40 years. Our office hardly saw a day for several weeks that the thermometer didn't hit 108 degrees, which got me down but not quite out to the point where I did much of anything about it except take it. Then followed, in early 1937, the worst flood in the history of this part of the country, which really was a dreadful experience. Two of the Mengel plants here in Louisville were inundated, but the one I'm at was enough out of water to let us build quite a few boats for rescue work. These, mind you, were all made of solid mahogany. This, of course, far from choice but only because boats

had to be built regardless of cost, and mahogany was the only stock we could get to that had sufficient width for the sizes of boats needed. They were quite a sight though, and, immediately the flood was over, disappeared, as you would expect. No doubt many a present-day downtown chiffonier or commode spent its early days on the Ohio in quite a different form. — Then at the tail end of the flood Louisville was treated to a small earthquake which, though it did next to no damage, was a new experience and, folks say, reformed many a drunkard and swelled church attendance for some time thereafter.

However, after these convulsions from my coming were out of the way, I guess the town gave up, and we both settled down to everyday living and doings. Little of interest has happened since, excepting, of course, the annual Derby, which is something. I don't have much horse in my blood but nevertheless I do enjoy going to the track that one day of the season. Take it in some year if you can. — ELMER A. SKONBERG, *Secretary*, 427 Park Avenue, Louisville, Ky.

1930

The January issue of The Review contained parts of a letter from Jack Bennett, II, and shortly after the copy for February's issue was due, your Secretary received word that your President was a father! Pollann Bennett was born on November 18 and her dad writes: "Our little Aussie will never be an M.I.T. man, but we're pretty pleased with her nonetheless. Both mother and daughter are doing well and we are looking forward to our first real family Christmas, even though it does come in midsummer. Now that a baby has joined the family, supplementing dog and garden already established, we feel completely at home here in Australia and like the life very much indeed. My best regards to all the gang." Jack's address is 19 Arnold Street, Killara, New South Wales, Australia. — At Christmas the engagement of Miss Marjorie Smith of Brookline, Mass., to Ed Prendergast, VI-A, was announced. To both Jack and Ed the Class extends congratulations!

Bill Yelland, V, has resigned his position as research associate at the Institute to join the staff of the Corn Products Refining Company as research chemist in the field of rayon warp sizing. Bill's headquarters will be in Edgewater, N.J. — PARKER H. STARRATT, *General Secretary*, 75 Fenno Street, Wollaston, Mass.

1931

A note from John Higgins takes No. 1 spot in this month's news, as it is the first letter to be received this year and sets in motion a few things for the future. As many of you may know, John is now at Technology as assistant to Nathaniel McL. Sage '13 in the Placement Bureau. Any of you gentlemen who visit the Institute ought to make it a point to stop in and pay John a visit in his palatial new headquarters. He is probably the most accessible man at Tech, as he is located

1931 Continued

in the new Rogers Building on Massachusetts Avenue on the first floor. You don't even need to open the door to get in: Just walk up the steps, the door will fly open to welcome you, and then turn to the right and there you are. We feel that we have hit upon the most painless way possible for classmates to pass along news of themselves to their Secretary. It is necessary only to approach the above-mentioned door, enter, turn to the right, greet John Higgins, and start talking. He will see to it that your gossip will find its way into these columns. John has further promised to send in an account of his recent trip to Europe, which will be sure to liven up the notes. He mentioned that Bror Grondal, Course X Secretary, was talking to him recently about getting news from Course X men and is going to send out reply cards for this purpose. In my wanderings around Cambridge I stopped at Lever Brothers and paid Bror a visit. He is married, has two children, both girls, and is now living at 375 School Street, Watertown. It so happened that the day I called, January 16, was a red-letter day for the Grondal family as the older girl was celebrating her second birthday.

Children are beginning to edge close to the center of the stage in the affairs of '31 men. From John Dodson we have an announcement of the arrival of Norman Lewis Dodson, 11 months after Charles Michael. John is living at 4681 Naples Street, Philadelphia, Pa., and has been on development work for the Barrett Company for the past year and a half, after three and a half years in charge of a C.C.C. camp. We have a card from Mr. and Mrs. Irving W. Finberg to which is attached a smaller card of Harvey Jay who arrived September 10. The Finberg family is living at 2723 Quentin Road, Brooklyn, N.Y. From Belgium we have the following card: "*Claire et Daniel Fraikin sont heureux de vous annoncer la naissance d'un petit frère Eric. Bruxelles, Le 9 Décembre, 1938. 40, Rue Louis Hymans.*" — The Class extends hearty congratulations to John and Mrs. Dodson, Irving and Mrs. Finberg, and Leon and Mrs. Fraikin on their new arrivals and wishes them every happiness. The last address in my files for Leon was in Cairo, Egypt.

From Hatboro, Pa., comes the announcement of the marriage of Miss Virginia Burns, daughter of the late Bishop Charles Wesley Burns of Boston and Mrs. Burns, to Tyler Parkhurst. Tyler and Mrs. Parkhurst are living at 269 East Meehan Avenue, Germantown, Pa. Tyler is now with the United Motors Corporation as service engineer in Philadelphia. — The marriage in Sharon of Miss Doris Elinor Stolar, daughter of Mr. and Mrs. Rudolph Stolar, to Elliot L. Whitaker took place on Christmas day. Elliot is a member of the faculty in the department of architecture at the Pennsylvania State College. — Mr. and Mrs. Robert H. Lupton announce the marriage of their daughter, Beatrice Matilda, to Donald Louis Herbert on Tuesday, November 15, at Cairo, Ill. The couple are at home at 2606 Washington Avenue, Cairo. — Mr. and Mrs.

Roland R. Cutler of South Sudbury announce the engagement of their daughter, Miss Isadore Goodnow Cutler, to Allan D. Elwell. Again may we extend congratulations of the Class and best wishes for the future. — BENJAMIN W. STEVERMAN, *General Secretary*, 11 Glenland Road, Chestnut Hill, Mass.

1932

During the last month I have had telephone calls from Carroll Wilson and Tom Sears. Unfortunately neither had any news for these notes. However, this suggested to me that since none of us are letter writers, some of you who are in the city permanently, or passing through, might use the telephone to give me news. The number is BRyant 9-6075.

Professor Locke '96 has sent the following memorandum which I am pleased to pass on to you: F. R. Morral is now engaged in research with the Continental Steel Corporation at Kokomo, Ind., after having spent a year or more on research study with John L. Bray '12 at Purdue University. Morral reports that he has not had any word recently from Technology Alumni in Spain, including C. Lana-Sarrate '18, the two brothers J. A. Serrallach '34 and J. P. Serrallach of our Class, and others. What news Morral does get from Spain indicated that conditions are very bad for the inhabitants. — Carroll Wilson saw in the Worcester *Telegram* of January 24 that "Albert D. King of the research staff of Massachusetts Institute of Technology has been appointed an assistant professor of chemical engineering at Worcester Polytechnic Institute. Mr. King . . . has been employed in several industrial corporations doing research work in photography, petroleum, paints and varnishes and dyes. . . ."

The engagement of Miss Marjorie Frances Moulton to Richard Maurice Cochrane was announced this last fall. At about the same time last year, Miss Beatrice Parks of Jamaica Plain became the bride of William Parker Libby, Jr., of Plymouth. They are making their home in Brookline.

Recently the following names have been sent to me by the office of the Register of Former Students as members of our Class for whom they do not have good addresses: Gustaf A. Olsen, D. Dana Price, Paul J. Provost (formerly Paul J. Velde), and Kenneth B. Thompson. If you have any information of their whereabouts, please write that office. — CLARENCE M. CHASE, JR., *General Secretary*, 3705 79th Street, Jackson Heights, Long Island, N.Y. CARROLL L. WILSON, *Assistant Secretary*, Research Corporation, 137 Newbury Street, Boston, Mass.

1933

Have had a couple of letters from some of the boys which will be of interest to the Class as a whole. Cal Mohr is now located in Rome, Ga., where he is working in the research division of the Tubize-Chatillon Corporation, makers of viscose and acetate rayon. This is quite a jump for Cal, as you know, inasmuch as he has

been in Niagara Falls for some years now. We all wish him well in his new venture. — I also have a letter from H. K. MacKechnie, who, after being with Shell Oil Company in New York for some time, took a position with the Mutual Boiler Insurance Company of Boston as sales engineer. He has now been sent out to Cincinnati by this company to open a sales office in that area. His specific territory is southern Indiana, Kentucky, Ohio, and western Pennsylvania, which covers plenty of miles. Mac is now living in Norwood, Ohio.

We also have an announcement of the marriage of Horace S. Beattie to Miss Doris Alliaume on November 26. The Beatties plan to live in East Orange where he is working with the laboratories of the International Business Machines, Inc. — If you fellows out there would remember that the Secretaries of your Class accept mail at the addresses noted below and send us some, we could fill up more space in these columns. — GEORGE HENNING, JR., *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn, N.Y. ROBERT M. KIMBALL, *Assistant Secretary*, Room 3-102, M.I.T., Cambridge, Mass.

1934

A fleeting note in passing has located Bill Ball and his wife in Johnstown, Pa. They were on their way to Altoona and Oil City in connection with the work which Bill is doing for the Ethyl Corporation. He mentioned that he ran into W. W. Hofman, who is working with Bethlehem Steel. We hope that you will give us more high lights on your travels, Bill. — Bill Leete is still with Veeder-Root of Hartford, Conn., where he is working in the counter department. — Johnny Wood is in Birmingham, Ala., where he is working with the Ingalls Iron Works Company. He is doing specifications in the marine department. The company is bidding on 30 boats which will serve the Maritime Commission in the South American trade. If they get the bid, that ought to keep Johnny busy for some time to come.

A few more of our lingering classmates have at last broken down and taken the final step into matrimonial bliss, or are making plans to do so. Bill Main is engaged to Miss Barbara Wilcox, daughter of Mr. and Mrs. Ralph B. Wilcox. Fred Haggerson has won the hand of Miss Isabel Rogers Whitman, daughter of Mrs. Homer Whitman of Niagara Falls, N.Y. Miss Whitman is a member of the Niagara Falls Professional Women Writers Association and of the National League of American Pen Women.

Merton Neill is to take the final vows with Miss Helen Nagle, daughter of Mr. and Mrs. John F. Nagle of Jersey City, N.J., in the late spring. Aaron Redcay has marched altarward with Miss Phyllis Needham '36, daughter of Mr. and Mrs. Wylder Linwood Needham of Park Drive, Boston. The ceremony took place December 26 at the Old South Church in Copley Square, Boston. The couple are now making their home in Baton Rouge.

Plan to attend Alumni Day at M.I.T. on June 5

1934 Continued

We trust that all of you are making plans for the fifth reunion in June. That is one shindig that you can't afford to miss. So plan to be there with bells on. In the meantime how about a little more news for your poor, struggling Secretary. — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, South American Development Company, Apartado 655, Guayaquil, Ecuador, S.A.

1935

For a change there is a bit of news to report this time, but don't take this as an excuse for not writing that letter. I'll start, as usual, with the matrimonial news: Howard Bernhardt and Roberta Ritter of New York are engaged. Howard is with Campbell Soup Company. Engaged also are Allan Mowatt and Marian Hubbell of Verona, N.J. Allan returned from the West Indies to take a job with W. H. Coburn and Company in Boston, as a statistician on market analysis and sales. Bart Chapman and Jeanette Birkett have signified their intentions. Bart is still with Remington Arms Company in Bridgeport, Conn. Ken Finlayson and Lucy MacBride are engaged. Ken is one of the recalcitrant members of the Class who have never let out the secret of their employment. However, we are fortunate in that the newspaper clipping concerning his engagement is one in a hundred which mentions occupation. We at last find out that he is with the M. W. Kellogg Company. Now that the secret is out, Ken, why not write the details? Ed Hicks has slipped a ring on the finger of Mary Weer of Boston. Ed was awarded the Ion Lewis Travelling Fellowship for study in architecture and is now working on plans for the San Francisco International Exposition. Jim Libby and Helen Crossman of Milton are to be joined in holy wedlock. Jim received his Ph.D. in chemistry from Tech last June and is now doing research for Du Pont in Wilmington, Del. Jack Holby and Mona Hewes walked the center aisle on November 19 in New York City. Jack is working for Boiler Room Equipment, Inc., in New York. Last marriage announcement of the month is that of Vincent Sorrentino. I do not have the name of the lady, nor do I know what Vin is doing now.

Three more of the boys sent in belated survey cards, and I'll give the low-down here to supplement the survey. Stan Alexander, lieutenant in the United States Navy, is in charge of the floating dry dock, *Dewey*, in the Philippines. He was married on October 17, 1936. He reports that Bob Perkins is hull superintendent in the Philippines. — Ben Schlimme is now an industrial engineer with Du Pont in Cleveland, Ohio, developing and evaluating economics of process and equipment changes. He was married last September 30. — Trow Levitt is working for his father as salesman and bookkeeper. They have a wholesale business in lamps, gift wares, and so on.

Dick Corbett is now studying at the Pennsylvania State College of Optometry in Philadelphia to become an eye doctor.

Quite a change from Course X to optometry. — A note from Charlie Locke '96, Alumni Secretary, mentions an item I should have included under matrimonials. It seems that Ed Clark has not been migrating back to Butte, Mont. at every opportunity for nothing. He will marry a Butte girl in June. Ed has yet to reveal the young lady's name.

Norman Kornetz has left the American Television Corporation to do research and development on television apparatus for Colonial Radio Corporation in Buffalo. Dick Lawrence reported that he, Dave McIntosh, and Jim Norman spent a week-end at Dave's summer home in New Hampshire. Dave is now working with the Jenny Manufacturing Company (Jenny gasoline) in Boston, the same company for which Dick has worked for quite a while. Jim is with B. F. Sturtevant Company in Boston. Dick mentioned that he has been busy as . . . (the usual expletive) and that the situation was not improved by a one-day strike which climaxed a considerable amount of collective bargaining in the company. Guess Dick is getting plenty of practical experience in labor relations. This winds up the class journal for this issue. Be with you again soon, and don't forget the letters. — ROBERT J. GRANBERG, *General Secretary*, Central Y.M.C.A., 100 Gibbs Street, Rochester, N.Y. RICHARD LAWRENCE, *Assistant Secretary*, 111 Waban Hill Road North, Chestnut Hill, Mass.

1936

The Monday of the Christmas week-end found a small group from our Class gathered at the Old France on Huntington Avenue, Boston, for lunch and a chat on old times and present activities. Those present were Elliott Robinson, our representative on the staff of the testing materials laboratory at Harvard University; Brent Lowe, who has finished the formal training course with Scovill in Waterbury, Conn., but is still learning plenty with that company and seems to be specializing in the new fasteners for men's shorts; Bob Sherman, instructor in chemistry at Phillips Exeter Academy; Bob Hannam, industrial representative with the Boston Edison Company; and your Secretary, Tony Hittl, engineer with the laboratory of the Linde Air Products Company in Buffalo. Bucky Hannam was the one with the most interesting tale to tell. After the recent hurricane on the East Coast, he had the job of restoring the service of the Boston Edison Company in the town of Burlington, Mass. He had complete charge of the work, with two crews of linemen, and axmen to clear away the trees, working under him. Although it took eight days to complete the job, Bob's was the first district of the Boston Edison to be restored to service 100 per cent. This won him recognition from the high officials of his company and praise in the editorial columns of the local newspaper. Good work, Bob.

A few other news items managed to slip out during our meal. We discovered from the Christmas cards signed Stan and Rowena that Stan Smith is now married.

This was a surprise to all of us. I was also reminded that I had not announced in these columns that Bill Nichols is now married. I understand the Nichols' have a cottage in Weymouth, Mass. Karl Gelpke's engagement to Miss Amanda Macy, a teacher in Belmont High School, has been announced. Bob Worden is still with the Campbell Soup Company and is now living at 222 Campbell Avenue, Upper Darby, Pa. Herb Goodwin is with the Raytheon Production Corporation in Newton. Ben Cooperstein is with Clear Weave Hosiery Stores, Inc. Finally, one of the group saw Bob Williams recently. He is working for General Electric in Schenectady, N.Y.

While I was in Boston, I stopped to visit with Dick and Louise Odiorne, who have an apartment at 121 St. Stephens Street. Dick is still the advertising man with Sutherland and Abbott. Over the week-end, I also visited with Vernon Osgood, who was home while new equipment was being installed in the Du Pont plant at Charleston, W. Va., where he is working.

The marriage of Miss Phyllis Needham to Aaron Redcay '34 occurred as scheduled on December 26 in the Old South Church, Boston. The young couple have joined the M.I.T. colony in Baton Rouge, La. November 11 saw the wedding of George J. Pearson, XVI, and Miss Ruth Osborn. Engagements announced recently include those of Malcolm Blanchard of the Bath Iron Works and Miss Dorothy Allin; Henry Wilsey of the Underwriters' Laboratories of New York and Miss Janet Patrick; Henry Johnson, a student at Harvard Law School, and Miss Virginia Dudley. A recent marriage was that of John Hibbert and the former Miss Harriet Mullane, on November 11. John is now an instructor at Harvard and is studying for a Ph.D.

Course I. A Christmas card from Bernie Gordon told the story that he is still with the United States Engineer Office in Little Rock, Ark. Another note was from Stan Levitt: "I am still with the bridge department of the Louisiana Highway Commission, my title being bridge detailer. Most of the work is routine, though at my tender age it is all good experience. I find myself well acquainted with many kinds of concrete structures. We don't do much work in steel. . . . I am taking a master's at Louisiana State University at night; it will take two years. . . . I am taking my thesis in structures. . . . I have been playing a lot of tennis. Won the Highway Commission tennis tournament early this fall. . . . Also met up with Tom Terry at the courts. He has been working for Standard." It would be good to hear from some of the other members of the Course.

Course X. A letter from Gerard Chapman relates that he is " . . . back among the Indians and wild men of the West." He continues: "My job with Skinner and Sherman in Boston went the way of many others in the 'recession,' and I was let out on March 31. I stuck around Boston till the end of May, hopefully looking for

1936 Continued

another but without success. . . . In Chicago I passed the summer with my family and on October 11 secured a tip from the Placement Bureau which resulted in a job with Bauer and Black. It is only temporary, however, being concerned with a patent infringement suit, and as soon as the matter is settled, out I go. Two of us were taken on at that time; the other fellow turned out to be R. G. Seyl '33. Furthermore, I found G. R. Orrill '29 holding down a research position there, and I have been driving into town with him every day." — Another brief item from Course X relates that Francis Peters is with the Boulder Lead and Zinc Mining Company, Joplin, Mo.

Course XVI. Complaining that he hasn't received a letter for over eight months, Bus Schliemann nevertheless has some news: "Charlie Endweiss deserves first place in the news. On September 17 I first heard from him after a long time. He flew here [Hartford, Conn.] from Philadelphia that Saturday morning in one of those dependable and proven Vought airplanes. We had quite a chat and then lunch, and I took him to the airport at four o'clock as he was due back in Philadelphia by five. He took off in pretty poor weather but headed right for Philly. About six weeks later he was here again but this time for only a few minutes when he flew a pal who was going to spend the week-end here in town. I asked Charlie if he had gotten home all right that previous Saturday, and he said yes, but not until the following Friday night. He had set down at Floyd Bennett for gas, and they wouldn't check him out on account of the weather. That was the week of the heavy rains, floods, and hurricane, so he had to wait over until the next Friday before things picked up enough to fly back to Philly. He is now attending the Marine Basic School, where he and five other fellows have four airplanes to fly around in their spare time. The basic school, according to Charlie, is the West Point of the marines. One night Charlie dropped into a tavern — he had a cold and thought a little beer might help it. There he ran into Marc Warmuth, who is still with Fleetwings in Bristol, Pa. I guess Marc had a cold also!

"From one of the boys in my office who just returned from Curtiss in St. Louis, I hear that we still have several representatives there. I believe that Hen Runkel, who was back in Buffalo for a while, is down there again helping them build a pursuit for China. Also in St. Louis are Bill Sangster and his wife. Bill had a little tough luck when his car ran down the side of a mountain all by itself and kissed a tree. But I hear Bill had just taken the case of beer out of the car, so it was only a minor tragedy. Also in St. Louis with Bill and Hen are Eddie Dashefsky and his pal, Jack Chapper. . . . The other day in a list of new technical memoranda and notes I saw one listed by William M. Benson. It was a study carried out at Stanford on contra-propellers. . . . The Sunday night after Thanksgiving, I saw Jack I. Hamilton for about

one minute. He was on his way from the Cape to Clifton, N.J., where he is still with Curtiss Propeller. They moved from Buffalo this summer. I was on my way back to Hartford from New York and was stuck in traffic while Ham was holding up a long line of cars because he was on a sheet of ice trying to get up a hill. I saw him only while I gave him a push, and the last I saw he was still rolling slowly up the hill. He tells me Joe King and Dick Koegler are still in Buffalo with Curtiss. . . . The last word I had from Yank Spaulding was when I saw him in Boston last spring just after he had been transferred from Florida to the Pan American base in Baltimore. Also by indirect information I hear that Web Francis is in Baltimore with Glenn Martin. So are George Trimble, Lombardi, and Harold Miller. Last time I was in Boston, Professor Markham '18 told me that Larry Sharpe had been in to see him on a trip from Chicago. Larry is still in the field of x-ray and seems to be right happy in his choice. And he seems to be going places. . . . Dorian Shainin is still with Hamilton Standard Propeller, where he is working hard. Early this fall Dor called up to point out a short paragraph in the morning paper saying that Lieutenant James Breathitt of the Army Air Corps was killed in a crash of his pursuit ship near London, Ontario, on the Canadian border. Our deepest sympathy to those he left behind him." — Bus is still with Vought in Hartford, Conn., where he and his wife live at 200 B. Sigourney Street.

Art Wells's Christmas card came from Capetown, South Africa. Art is on his way around the world and hopes to write about some of his experiences soon for this column. — Bob King, XII, is with the Climax Molybdenum Company, Climax, Colo.

The foregoing notes were intended for the February issue, but your Secretary didn't get them to The Review Office until after the class notes section had gone to press. I assume entire blame for the omission; my only excuse can be that I went home for the Christmas holidays instead of tending to business. But anyway, you have them now, and most of the news was new last summer; so that perhaps another month won't matter too much. Of course, if it's new to us we like to hear about it no matter how long ago it happened. So if any of you fellows have some news, recent or old, which you have been keeping to yourselves, write it to your Course Secretary or to the General Secretary right away; don't wait until it's convenient! And in return I'll try to see that it is published promptly.

Additional information which has been received concerning the Redcay-Needham wedding previously mentioned indicates that two members of our Class were ushers for the occasion. They are Don Thompson, V, of United States Rubber Products, Inc., Passaic, N.J., and George Schmalz, Jr., XV. We understand that this was quite an M.I.T. affair. Another marriage which has not previously been announced in these columns is that

of Dick Bryant, II, to the former Miss Elizabeth Bramhall, a graduate of Jackson College, on November 10. Dick is assisting in the Mechanical Engineering Department at M.I.T. Recently announced engagements include that of Joe King, XVI, to Miss Elizabeth Drake. Joe is working with the Curtiss Aeroplane Company in the engineering division in Buffalo. The wedding will take place in June. Next fall Harrison Myrick, who was associated with our Class in the freshman year, will be married to Miss Elizabeth Cook. The engagement of Clarence R. Horton, Jr., XIII, and Miss Louise Gardner of Pittsburgh has been announced. Horton is working for the Dravo Contracting Company of Pittsburgh. Bob Van Patten-Steiger is engaged to Miss Margaret Hodges, Skidmore '37 and a graduate of Katharine Gibbs.

A couple of brief items help us to locate a few more of the missing boys. Bill Boland, XVI, who was formerly at the Atlanta, Ga., station of the United States Weather Bureau, has been transferred to the Birmingham, Ala., station. Ed Nicholson is another of the M.I.T. group with the Standard Oil Company in Baton Rouge, La. Harry Hubbell is now working with the department of physics of Williams College at Williamstown, Mass.

Course XVII. The chief news for this month is a letter from Dick Halloran which explains itself: "On the evening of December 26 the Course held its third annual reunion in the Parker House at Boston with a very good attendance. . . . As four of the members of the Class were missing . . . it may be of interest to list against each man the information gathered at the above meeting or from the communications leading up to it. Charles Betts: present and now working for Tremaglio Brothers of Waterbury, Conn., as assistant superintendent on the new post office at Norwich, Conn. Charlie states he is engaged and will be married this year. Arthur Carota: definitely present and still working as assistant manager for the Cantera Construction Company of 1508 Pennsylvania Avenue, Wilmington, Del. Art reports local business as rather dull and fervently hopes for a speedy revival of private construction, as public works competition is very keen in his district. Robert Leventhal: present and working as salesman and engineer for the Boston Plate Glass Company. Joe is very enthusiastic about his work and has a great deal of information about the many new uses of glass in building construction, particularly as a decorative agent. His address is 18 Wolcott Street, Dorchester, Mass. Saul Lukofsky: not present but represented by a very excellent letter describing his position as 'materials expeditor' in United States Steel's 80-inch hot-strip mill department of the sheet-steel and tin-plate plant at McKeesport, Pa. Saul declares his duties are of many aspects, but he is very pleased with them in spite of the fact that they are mainly problems in mechanical engineering. Saul is in frequent contact with Ned Collins '35, XVI, who is engaged in pro-

Plan to attend Alumni Day at M.I.T. on June 5

1936 Continued

motion work for the Carnegie-Illinois Steel Corporation. Other sights worth seeing, we read, in McKeesport are a mass-produced community of low-cost houses with stress on steel construction products and the ladies. I may have misinterpreted the last, but Saul writes that his association with the steel people has changed him considerably even to the extent of his abandoning philosophical discussion. Perhaps he should tackle the government's spending policies, now that his mind is clear. . . .

"Sebastian Mazzotta: not present and not accounted for. Information wanted. Robert Sawyer: present and working as designing engineer for E. B. Badger and Sons, a Boston firm of civil engineers. At present Bob is designing the pipe work for an oil project in the tropics and says his work is very interesting. His address is 55 Robinwood Avenue, Jamaica Plain, Mass. Frank Scheottler: not present. Although not heard from recently, Frank is probably still working with his father's firm in Louisville, Ky. His present address is 1264 Eastern Parkway, Louisville, Ky. Norman K. White: present and working for his father's construction firm on a job in Springfield, Mass., where his address is 55 Ventura Street. Richard Hickman: not present but represented by a letter stating that his work as one of the T.V.A. engineers allowed him only a short holiday to spend in Knoxville, Tenn. . . . Also mentioned at the reunion by a certain citizen who passed through Knoxville recently was that Dick is contemplating marriage. (Here-with confirmation from another source. The girl is Miss Delia Kyle Peet of Knoxville, and the wedding is to occur in October.) Dick's address is 2513 Park View Avenue. Angelo Tremaglio: present as ever and still working as job superintendent for his family firm of Tremaglio Brothers, 1500 Highland Avenue, Waterbury, Conn. With him is his side-kick, Johnny Viola, and they are now getting ready to wind up the interior work on a \$500,000 tuberculosis sanitarium at Shelton, Conn. Angelo started this job last August, and I believe its completion will mark more than a million dollars' worth of construction completed by Johnny and him since graduation, which is a fine record. Incidentally, a good portion of the Course has now served sometime with T. Brothers, including Sebi Mazzotta, Viola, Betts, Angelo, and myself. Ange also announces his coming marriage, but no date has been set. His address is 88 Francis Street, Waterbury.

"John Viola: present and, as mentioned above, working with Angelo Tremaglio on a job in Shelton, Conn. Johnny has become quite the builder, and although there is some doubt whether his lady lives in Boston or Waterbury, I understand that he also contemplates marriage. Johnny merely looks wise at snooping questions, so this will have to await further development. He lives at the Y.M.C.A., Waterbury, Conn. William Mullen: present. Burch has been working as engineer for the construction firm of

McCreery and Theriault of Boston on the laboratory of the Wright Brothers Wind Tunnel and the new field house at the Institute. His work is sometimes inspected by Professor Voss '32, who doubtless finds it above criticism in view of its engineer's excellent training. Burch's present address is 1092 Bennington Street, East Boston, Mass. R. Halloran (the author of this letter): present and now working in a very general capacity for my father in the nursery and arboriculture business. I will probably appear in the construction field again when the industry is actually looking for men rather than merely trying to maintain them. We can report some swelling of assets as a result of the hurricane. My most recent technical work consists of redesigning some of our large tree-handling equipment in steel with a view to speeding up this process. My present address is 95 Dedham Street, Newton Highlands, Mass. I see this letter is rapidly assuming the proportions of a director's report, so I will wind up."

Not at all agreeing with the above report about Angelo Tremaglio is a letter recently received by me from none other than Australia. This letter is signed with that name and reads: "Well, I just thought the boys of '36 would like to know that, early in August, I was married to Miss Bridget Fogarty of South Boston. Immediately following the wedding we embarked on a world tour starting from New York and crossing the Pacific after passing through the Panama Canal. We are combining business with pleasure by studying foreign housing conditions while honeymooning. So far the most interesting developments we've seen have been in the Fiji Islands and in Borneo." I think of only three possible explanations for this difference in reports: First, Angie may have returned in time to be at the Boston reunion and his letter was a long time in getting to me; I can't read the date on the postmark. Second, Dick may have been so excited he didn't know who was at the reunion. Finally, this letter may account for the lost Seby Mazzotta who is playing a good trick on his pal. You can pick the solution you want.

Before concluding this month's notes, I want to tell about my New Year's spent with Charlie Holman. Charlie was in Buffalo visiting his fiancée, Miss Priscilla Denison. Yes, he's given her a diamond ring, and the engagement was announced during the Christmas week. Charlie and I celebrated New Year's night together and had a great time talking over old times. He is now working for the Columbia chemical division of the Pittsburgh Plate Glass Company. I understand his position has to do with the design and installation of equipment in the powder plant. Of course, I met Priscilla too and found her very interesting. Charlie told me about the trouble that Don Kenny has been having with his leg. Seems that his old knee began bothering him again and he had to have a couple of operations and was in pretty bad shape for a while. However, he's on the mend again now,

although the latest news was that he was still at home in Milton. — ANTON E. HRTTL, *General Secretary*, 491 Ashland Avenue, Buffalo, N.Y. ALLEN W. HORTON, JR., *Assistant Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

1937

The Class as a whole seems to have dropped completely from the picture. Except for a few murmurs now and then I would think you had all joined the Foreign Legion or are far away in the wilds of Tibet. However, there have been some interesting events lately, not the least of which concerns me, not as secretary but as an individual. You see, when I came to Bound Brook, I met a very charming and beautiful young lady — but Dick Young was there and saw everything and is now pushing me away so he can tell it himself: "Our courageous Class Secretary walked down the aisle with Alice Irene Hall (now Johns, you dopes) on the evening of Saturday, December 17, and off they are to a life of fullest joys. I was fortunate enough to be close to Bound Brook — actually there to see our Windy uphold his part of the formality with the pomp and dignity expected of a leader of the Class of 1937. Windy will be nesting at 245 Hale Street, New Brunswick, N.J. Alice Johns and he would be very happy to have any of you drop in to say hello." — Your account is approximately true, Dick, and very well said. Incidentally, Dick himself is halfway to the altar. He was accompanied at my wedding by his fiancée, Miss Marjorie Carlyle Squires of Brooklyn.

J. W. Montgomery, after spending two months during the summer at his home in British Columbia, joined the engineering staff of the International Nickel Company at Copper Cliff, Ontario, the latter part of September, and he is now located at the Levack Mine of that company. The job is in the engineering department, dealing particularly with the underground surveying and the office work connected with it. This company has big mining operations and has just finished the construction of the new shaft and surface plant at a cost of two and a half million dollars. Montgomery is apparently very happy on the job. — Eric Swenson stepped off the deep end way back on October 9 with the former Miss Ruth Virginia Grant of Winthrop, Mass. John Nugent was on hand as an usher to give him a good send-off.

Dick Young also writes of a get-together of 20 Tech men at the Naugatuck Y.M.C.A. Are you sure it wasn't the Y.W.C.A., Dick? They had a typical good old M.I.T. bull session, which was finally turned to a program concerning the activities of the Naugatuck division of the United States Rubber Company. John Gander and Phil Dreissigacker are with Dick at the Farrel-Birmingham Company in Ansonia, Conn.

I see by the paper that John Gallagher is contemplating the holy state of matrimony with Miss Florence Pettit of Palmerton, Pa. — Another with the same idea is H. Coolidge Adams, Jr., with Miss

1937 Continued

Cynthia Dechert of Calif. — Our versatile administrator, Bill McCune, decided to take on another responsibility when at Christmastime his engagement to Miss Janet Waters of Fall River, Mass., was announced. Janet is now a senior at Wellesley, and Bill, you know, is living in Erie, Pa. Jim Farley and his pony express evidently supply the link. — Dick Lamphere, our "Green Mountain boy from Vermont," sets us all back on our heels with the announcement of his marriage a few months ago. Dick and his wife have moved to 308 Barnes Street, Wilkesburg, Pa. Here's a batch of three engagements announced recently: George DeArment to Miss Janet Owens of Syracuse, N.Y.; Norm Tompkins to Miss Audrey Seeley of West Newton, Mass.; Jim Loder to Miss Ruth Ulmer of Newton Center, Mass.

With all due apologies to Norm Birch, I'm going to take the liberty of quoting his very excellent newsy letter "with nothing aforsight and malice toward none": "... The most recent letter and a very welcome one since it is the first I've received from Bob Brauer, comes from Whiting, Ind., where Bob is working with the process design group of the research division of Indiana Standard Oil. Bob spent the year after graduation in the Course X-A Practice Schools at Bangor, Buffalo, and Boston (and what a time in Boston!). He is much enthused over his work and equally enthused over his plane trip home at Christmas — the reason, of course, he went with an engagement ring for Miss Rita Carr, whom some of us remember as being an unusually pleasing person, and she said 'yes'.

"Incidentally, Bob contributes a little dope that I pass on secondhand: 'Alden Acker, Joe Heal, and myself got together a few months ago to give Arch Ahmadjian a send-off to his new job with Lockheed Aircraft in California. Arch had been working in Hammond for the same outfit that Joe Heal (now married and building a home there) works for.'

"Now that we are on the Pacific Coast, and with the aircraft outfits, we can fittingly mention the activities of several others: Pappy Pitkin and wife sent me a very pleasant Christmas greeting, for which my thanks to them. — Harry Kohl is still with Boeing at Seattle and is working at present on equipment for land transports for T.W.A. and Pan American. Jim Clifford left Boeing in October to travel back East to join Martin Aircraft in Baltimore. Harry and Jim drove across the country in August to make sure that Wayne Pierce would end his single blessedness with the proper ceremonies. Harry was best man at the wedding and, I hear, made quite a hit with the bridesmaids. That man sure has what it takes! Harry drove back to Seattle in four days, quite a record for driving alone. And, to bring in the romantic interest, since it definitely exists, she is a University of Washington coed and accounts for the lack of interest in the previously mentioned bridesmaids. Harry also writes that Pappy and Marian (Mrs. Pitkin) spent a week-end in Seattle. His comment:

'She is one very swell person.' — Wayne Pierce and Eunice (nee Miller, of the Millers of Concord, Mass.) are housekeeping at Manchester, Conn., where Wayne has been associated with the Chance-Vought Corporation since graduation. I sincerely hope they don't mind my quoting the personal note on their Christmas greeting, which was so indicative of what I hope happens to all us benedicts at some future date: '... get married and come back here to live. Honestly, it's fun from seven-thirty in the morning to seven-thirty in the morning.'

"Bob Thomson, the 'Iron Man' of the early sessions on the Charles River, seems to be alternately at Bayonne, N.J., and Newburgh, N.Y. To clarify the situation a little, Bob is at present erecting some storage tanks for Texaco at their Bayonne terminal. However, a dock erected last summer and, I suspect, a brunette are the reasons for driving the 90 miles to Newburgh. It seems that Bob built the dock to stay built, but a Standard Oil tanker, the ice in the Hudson, and a few other extraneous causes keep it in need of frequent repair. I haven't any information about the other factor. I spent a very pleasant though wet (both literally and figuratively) day with Bob the last week of June. I had traveled East in a rather dilapidated but very serviceable Model A roadster by way of Columbus, Ohio, Cumberland, Md., and Philadelphia, Pa., and arrived in New York City to find a letter from Bob inviting me to a choice seat at the Poughkeepsie regatta. I saw the dock and then rode up river on the Day Line with Bob and his friends. Association with the dock (again) came in very handy, since the contractor who built it had a pile driver moored very close to the finish line. The procedure was to make merry in the heated cabin while listening to the race on the radio; then to climb the tower to watch the crews go by; and to relax again in the cabin while the announcer summarized the race and gave the times. A most excellent situation, but I'd still rather row, and even lose if not up to par, than to watch idly from the side lines.

"On the same trip East, I spent a very restful and very welcome (after two days of bouncing) night at the home of Al Hazeltine at Westfield, N.J. Al is in the patent department of Philco Radio at Philadelphia. I have recently had a letter telling of his work and also of rowing with the Vesper Boat Club during the summer. Al has deserted the eight and has taken to singles. He admits he tipped over in one; but that doesn't even approach his disgrace (in which I have to admit I was a partner) of sinking in an eight-oared shell within ten feet of the Cambridge wall. Incidentally, Al is driving himself hard, as usual, by studying law five nights a week. ... I hear from somewhere that Red Cohen and better half have left the Pittsburgh district for somewhere in the vicinity of Boston. — To take a long jump, Bob Jordan has severed his connections with the Crane Valve Company and is working for some outfit near Chicago, making

stainless trim for showcases. They tell me that Bob is assistant supervisor or something. How about it, Bob, can you verify the title and also give a little more to fill in this monthly empty space? — Bob Ferguson sent along a Christmas card, still from Grantwood, N.J., which I assume means that he is still with the Aluminum Company of America. ...

"Charlie Cardani, Dick Fowler, and Sam Noodleman are with Delco at Dayton, Ohio. I met Sam and Dick at a dinner of the Technology Club during the first week in December. — Norm Matthews, who has been in the metallurgical department of the National Tube Company at Lorain, Ohio, since graduation, came to Middletown to visit me about four weeks ago. We had quite a confab over the development and experiences which go with a year and a half out of the Institute. It's a long story! Norm has an exceptional opportunity in that National Tube sent him to the research laboratories at Kearny, N.J., for probably a year, which began February 1. And, to bring in the heart interest again, Norm was rather loath to leave. However, one of the condolences is that he will be close enough to Harrison, N.J., to room with Al Haskell. Al has left Duquesne, Pa., and is now associated with the Crucible Steel Company of America. Now all I have left to do is to convince the board of directors of the American Rolling Mill Company that this plant in Middletown, Ohio, should be moved to New Jersey so that I could make it a trio. The gang have sort of left me by my lonesome here in the Middle West. — Finn and Fischer, that inseparable duo, are still in the woolly wilds of Colorado or Montana somewhere. — Bill Boudreau is here in Middletown with the American Rolling Mill Company. He is at present connected with the research division in their new and well-publicized building. Bill and his wife and baby have made a niche for themselves in this friendly town and are very much at home. I see them quite frequently downtown shopping or on their way visiting.

"As for me, I still find work in the metallurgical department practically all-absorbing and sufficient unto the day thereof. I have spent the past three months working on statistics pertaining to the open hearth and the quality of open-hearth steel; it has been a pleasant change from working an occasional week of midnight-to-eight turns in the mill. My main ambition now is to find two weeks' vacation to get back East to visit home and a few people. — As a final comment, I'd like to make it plain that I've left out all the amusing and embarrassing incidents of my daily life, with which some of the fellows mentioned in this dope sheet may be acquainted. That, as an added inducement for a few of you to write in to retaliate for some of the direct statements and implications in the above. — Except, that I'd like to offer my personal congratulations to Henry Guerke and to Lois and to men-

Plan to attend Alumni Day at M.I.T. on June 5

1937 Continued

tion to Norm Matthews that today I bowled a 196!" — WINTHROP A. JOHNS, *General Secretary*, 245 Hale Street, New Brunswick, N.J.

1938

A distinguished group of contributing editors are collaborating on this issue of the class notes, and our hope is that the general effect is enjoyable to our reading public. (We hope we have one, but as yet it appears to be voiceless!) Our social notes are of especial importance this month as they include the announcement of the engagement of our inimitable Beta and Class Secretary, Dale Francis Morgan, to Miss Jeannie Watson Drake of New Rochelle, N.Y. Our congratulations to Dale, and may this step have a salutary effect upon his efforts as your faithful scribe. (Dale would like it known, however, that he did not write this particular paragraph.) — We are pleased to announce also the engagement of Bill Camp, XV, to Miss Priscilla Glazier of Greenfield, Mass. Not to be outdone, Bill's brother D. U., John Argersinger, II, is engaged to Miss Mary Elizabeth Beers of Tacoma, Wash. — Lest you think the D.U.'s are getting the upper hand on the engagement business, please realize that Newt Hammond, IX-B, who is incidentally now mixing batches of Campbell's tomato soup and who is no less of an inimitable Beta than our Secretary, has become engaged to Miss Hilda Morrison of Brookline. Also engaged is Nick Wheless, X, to Miss Elsie Hooks of Shreveport, La. We also learn with pleasure of the marriage of Norm Bedford, XV, to Miss Alice Messier of Wollaston, in Philadelphia at Christmas. Norm is learning the steel business with Bethlehem Steel Company.

While we're still in the social section we feel obliged to mention our class gift which, as you know, is a scholarship fund being built up through insurance policy assignments and/or straight gifts. You should also know that preference is to be given to children of the Class of 1938, and this is where the social part comes in. Doc Thompson, I (who is in the underwriting division of Liberty Mutual), and Mrs. Thompson have announced the birth of a son, which son is, so far as we know, the leading contender for our scholarship!

News at last from our wandering sailor boys of Course XIII, specifically from none other than R. C. Eddy, who has been sailing all over the Caribbean as a refrigeration engineer in the bowels of United Fruit Ships. Bob's now in the "Shore Gang" in New York, which he states "is nonpolitical, nonsocial, non-sectarian, and noneverything, practically. This august body gives refreshment and repair to the working intricacies of various and sundry of the finest ships this country possesses." — Archie Main and Louis Bradford are living in a modish apartment in Brooklyn (10 Montague Terrace). Archie is working for Federal Shipbuilding on destroyers in particular, and he informs us that Louis has a lot to do with the design of the C-2 freight-

ers which George Sharp is turning out. — Welles Worthen is also in New York, and we quote again from Bob Eddy's letter: "Welles is somehow connected with the stevedoring, and when I see him, he's in the timekeeper's office, looking official in white collar and studious in horn-rimmed glasses." — We want to thank Ira Lohman, VI, for his helpful notes. Ira has been with Jackson and Moreland, consulting engineers, since November. He has the following news for us: Johnny Wheale, XV, returned from his European travels with the Thorne-Loomis trip to a job "at the Bridgeport Brass Company. After being an annealing-furnace operator for a while, was transferred to the pickling division where the metal is cleaned after the annealing." Johnny has six men with him on the night shift, 3:00 to 11:00 P.M. From another Thorne-Loomis traveler, Howard Ness, XV, who is at Donora, Pa., with the American Steel and Wire Company, we hear: "After spending two days in Cleveland meeting the company executives I was transferred here to . . . the open-hearth works. This is a wonderful training course this company gives. Every month we have to write a 10,000-word report on some phase of the business, as well as take a written and oral examination." Another XV man, Adam Gambel, is down in New Orleans with the Henderson Sugar Refining Company. — Rafael Sanchez y Casanova, VI, reports: "I am working for the Cuban Mining Company, a subsidiary of the Freeport Sulphur Company of Louisiana. — I am planning to go back to Tech next year, if possible, for a master's degree." — We hear that Frank Kearny, II, is (working) in New Orleans but know little definite. His correspondence at the Institute seems to have been noticeably limited to one person.

We hereby invite each and every '38 man to make his contribution to the Class scholarship fund — which is coming along but slowly. Checks may be sent to one of your Secretaries or to the Institute Treasurer. — DALE F. MORGAN, *General Secretary*, Graduate House, M.I.T., Cambridge, Mass. LLOYD BERGESON, *Assistant Secretary*, 885 Beacon Street, Newton Center, Mass.

COURSE I

Nick Barbarossa and Ed Martin are studying very hard at Fort du Pont, Del., to pass the exams which come at the end of their year's service with the First Engineers. Fifty men from their group will be give commissions at that time. Good luck to both of them. Ed has been sleeping with boards under his mattress to help him stand straight. The reports we hear about the hard army cots can't be true, if they need stiffening. — Jimmy Emery has a position with the American Transit Company, which is made up of streetcar and bus lines throughout the country, to determine a method of analysis to be used in their accident reports. — Johnny Glacken is reported to be working for the Department of Public Works in Framingham, Mass. — Mike

Forman, after summering in the Adirondacks, is learning all about the insurance business in Maine. He is located with the Springfield F. and M. — Congratulations are in order for Bob Williams who placed No. 7 on the Civil Service exam to land a job with the United States Geological Survey. We are also told that Paul O'Connell is with the Tennessee Valley Authority; Tony Smith and Curt Torrance are with the engineering department of the city of Hartford; Jack Wilson is doing drafting work for the Metropolitan District Water Supply Commission, Boston; Gus Rossano has been working as engineer and assistant estimator for the Mezzullo Construction Company in Port Chester, N.Y. Your Course Secretary has been shifted to the contracting division of the Dravo Corporation. — THOMAS EVANS, *Secretary*, Y.M.C.A., Coraopolis, Pa.

COURSE X

Joe D'Angelo and John Rote, Jr., are working for Reichhold Chemicals, Inc., in Westfield, N.J., and doing research on plastics. Waddy Hinds has settled with his wife in Waterville, Maine, where he is working for one of Maine's paper mills.

The oil companies have claimed their share of our classmates, with Horace Homer working for Cities Service Refinery in Braintree, Mass.; Chuck Jahng and Ollie Kangas with Standard Development Company in Bayway, N.J.; Arnold Kaulakis with an oil company in Texas; Fred Ray working for Standard Oil in Paulsboro, N.J.; and Nick Wheless, who is a "roughneck" in the East Texas oil fields. Elmar Piel, V, is with Shell Development Company in San Francisco and Will Shamban with Viscose Company in Rome, Ga.

Aram Kerkian has become city chemist in Newburyport, Mass. Dick Koehrmann is busy at a tannery in Manchester, N.H. Carle McEvoy is now a salesman for a steel company in Chicago. Don Mitchell has the job of assistant process engineer with Walter Baker and Company, Inc., chocolate manufacturers in Dorchester, Mass. Bob Treat is with the Goodyear Tire and Rubber Company. And Jack Wilber is working at Crown Can in Philadelphia, where Barney Mehren is engaged in both pure and applied research. Howie Schlansker is with the Gillette Company in Boston.

Peer Cody is teaching at Northeastern and in his spare time is studying at the Institute. Fred Schmitt is an instructor at Cooper Union.

The boys who are now busy designing a revolutionary nitric acid plant are Leon Baral, Abbott Byfield, Jack Chapin, Punchy Christgau, Frank Dowding, Bert Grosselfinger, Charlie King, Fred Kolb, Dale Morgan, Bob Park, John Phillips, John Phinney, Art Rowley, Paul Tillson, and Dave Torrains. Graduate work at the Institute also occupies Dick Bartels, James Downing, VIII, Charlie Smith, VIII, and your Course Secretary.

Dave Acker is working under Professor Hottel '24 and Henry Homeyer, under Dr. Hauser. — EBEN J. O'BRIEN, *Secretary*, 99 Spruce Street, Watertown, Mass.



Why Dad! Do YOU Question the Future?

DAD may question. During his lifetime he's seen electric lights replace oil lamps; the widespread installation of sanitary plumbing and central heating. He's seen the growth of the automobile and the radio; the development of the airplane, the motion picture, and the electric refrigerator. Dad, somewhat like the Patent Office official who, long before 1900, is said to have resigned because he thought all the worthwhile inventions had been made, sometimes finds it difficult to share his son's enthusiasm for the future.

But Dad forgets that the forces which have made America the most prosperous nation in the world are working more effectively today than ever before. They are the forces of

American industry—creating *more goods for more people at less cost*—developing new products, constantly improving them, making them so inexpensive that more millions of people can buy them. That's the process by which the American standard of living has been made the highest in the world. And because American industry is applying it today with ever-increasing vigor, still greater progress is assured for the future.

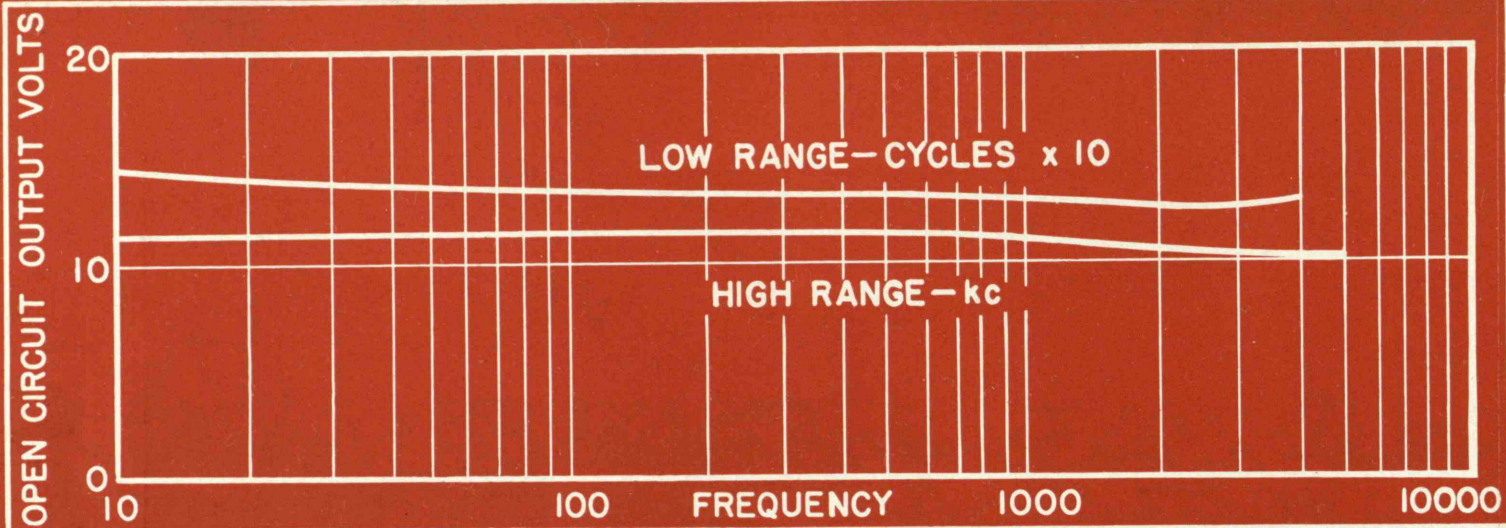
In this progress, General Electric scientists, engineers, and workmen play an important part. Their efforts today are directed to the task of creating still higher living standards for the people of this country.

G-E research and engineering have saved the public from ten to one hundred dollars for every dollar they have earned for General Electric

GENERAL  **ELECTRIC**

90-109DH

VISIT THE G-E "HOUSE OF MAGIC" AT THE FAIRS



New Wide-Range Beat-Frequency Oscillator

FOR some time there has been need for a wide-range oscillator with substantially constant output of moderate power, not only for general laboratory bridge measurements but also for taking selectivity curves over a very wide range of frequencies, for measuring transmission characteristics of filters and for testing wide-band systems such as television amplifiers and coaxial cables.

The new General Radio Type 700-A Beat-Frequency Oscillator was designed for these applications. Through unique circuit and mechanical design and very careful mechanical construction it has been possible to manufacture an oscillator of good stability, output and waveform at an exceptionally low price.

Features

WIDE RANGE — two ranges: 50 cycles to 40 kc and 10 kc to 5 Mc.

DIRECT READING — scale on main dial approximately logarithmic in frequency. Incremental frequency dial direct reading between -100 and +100 cycles on low range and -10 and +10 kilocycles on high range.

ACCURATE CALIBRATION — low range: $\pm 2\%$ ± 5 cycles; high range: $\pm 2\%$ ± 1000 cycles; incremental dial: ± 5 cycles low range; ± 500 cycles high range.

GOOD FREQUENCY STABILITY — adequate thermal distribution and ventilation assure minimum frequency

drift. Oscillator can be reset to zero beat to eliminate errors caused by small drifts.

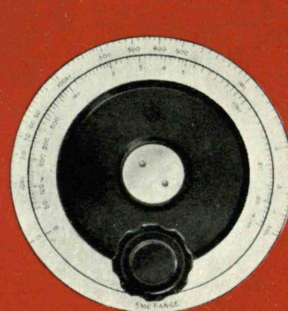
GROUNDING OUTPUT TERMINAL — output taken from 1,500 ohm potentiometer.

CONSTANT OUTPUT VOLTAGE — open-circuit voltage remains constant between 10 and 15 volts within ± 1.5 db over entire frequency range.

GOOD WAVEFORM — total harmonic content of open-circuit voltage is less than 3% above 250 cycles on low range and above 25 kc on high range.



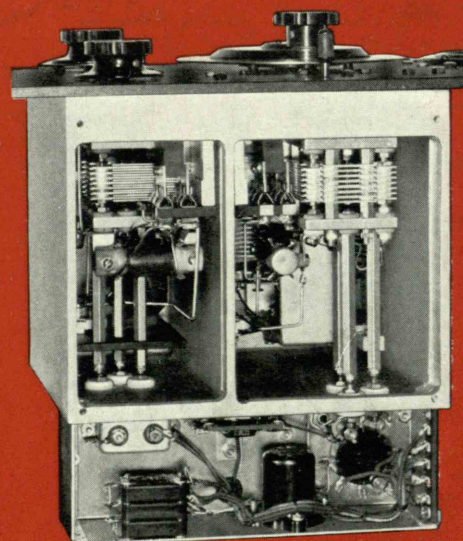
L to R, TOP, Frequency increment dial — main frequency control — output voltmeter
BELOW, Zero adjustment — range switch — output control



Main frequency dial — engraved approximately logarithmically — scale length per decade $3\frac{1}{2}$ inches



Frequency increment dial — plus or minus 100 cycles, low range; plus or minus 10 kilocycles, high range



Oscillator housing — uniform heating distribution between the two oscillators obtained by quarter inch aluminum walls

Type 700-A Wide-Range Beat-Frequency Oscillator \$555

● WRITE FOR BULLETIN 377 FOR DATA